17. A fuel comprising:
a source of at least one hydrino hydride ion;
a source of protons.

18. A fuel according to claim 17, further comprising at least one burn modulator.

19. A fuel according to claim 17, wherein said fuel is formulated for use as a rocket fuel.

20. A fuel according to claim 17, wherein said fuel is liquid at ambient temperature and pressure.

21. A fuel according to claim 17, wherein said fuel is gaseous at ambient temperature and pressure.

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22. A fuel according to claim 17, wherein said fuel is solid at ambient temperature and pressure.

23. A fuel according to claim 17, wherein said source of said protons comprises an acid.

24. A fuel according to claim 23, wherein said acid is a super-acid.

25. A fuel according to claim 23, wherein said acid is selected from the group consisting of HF, HCl, H_2SO_4, HNO_3, the reaction products of HF and SbF_5, the reaction products of HCl and Al_2Cl_6, the reaction products of H_2SO_3F and SbF_5, the reaction products of H_2SO_4 and SO_2, and combinations thereof.

26. A fuel according to claim 17, wherein said source of protons comprises H^1.

27. A fuel according to claim 17, wherein said source of protons comprises H^2.

28. A fuel according to claim 17, wherein said source of protons comprises H^3.

29. A fuel according to claim 17, wherein said source of hydride ion comprises at least one compound comprising a hydrino hydride ion and at least one other element.

30. A fuel according to claim 29, wherein said compound comprises at least one hydrino atom having a binding energy of about $13.6/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

31. A fuel according to claim 29, wherein said compound comprises at least one dihydrino molecule having a first binding energy of about $15.5/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

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32. A fuel according to claim 29, wherein said compound comprises at least one dihydrino molecular ion having a first binding energy of about $16.4/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1, and at least one other element.

33. A fuel according to claim 29, wherein said compound comprises a hydrino hydride ion having a binding energy of about 0.65 eV and at least one other element.

34. A fuel according to claim 29, wherein the compound further comprises one or more selected from the group consisting of ordinary hydrogen molecules, ordinary hydride ions, ordinary hydrogen atoms, protons, ordinary hydrogen molecular ions, and ordinary H^{3+}ions.

35. A fuel according to claim 29, wherein the compound has a formula selected from the group of formulae consisting of MH, MH_2, and M_2H_2 wherein M is an alkali cation and H is selected from the group consisting of increased binding energy hydride ions, hydrino atoms and dihydrino molecules.

36. A fuel according to claim 29, wherein the compound has the formula MH_n wherein n is 1 or 2, M is an alkaline earth cation and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

37. A fuel according to claim 29, wherein the compound has the formula MHX wherein M is an alkali cation, X is one of a neutral atom, a molecule, or a singly negatively charged anion, and H is elected from the group consisting of hydrino hydride ions and hydrino atoms.

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38. A fuel according to claim 37, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

39. A fuel according to claim 29, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

40. A fuel according to claim 39, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

41. A fuel according to claim 29, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a doubly negatively charged anion, and H is a hydrino atom.

42. A fuel according to claim 41, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

43. A fuel according to claim 29, wherein the compound has the formula M_2HX wherein M is an alkali cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

44. A fuel according to claim 43, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

45. A fuel according to claim 29, wherein the compound has the formula MH_n wherein n is an integer from 1 to 5, M is an alkali cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

46. A fuel according to claim 29, wherein the compound has the formula M_2H_n wherein n is an integer from 1 to 4, M is an alkaline earth cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

47. A fuel according to claim 29, wherein the compound has the formula M_2XH_n wherein n is an integer from 1 to 3, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

48. A fuel according to claim 47, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

49. A fuel according to claim 29, wherein the compound has the formula $M_2X_2H_n$ wherein n is 1 or 2, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

50. A fuel according to claim 49, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

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51. A fuel according to claim 29, wherein the compound has the formula M_2X_3H wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

52. A fuel according to claim 51, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

53. A fuel according to claim 29, wherein the compound has the formula M_2XH_n wherein n is 1 or 2, M is an alkaline earth cation, X is a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

54. A fuel according to claim 53, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

55. A fuel according to claim 29, wherein the compound has the formula $M_2XX'H$ wherein M is an alkaline earth cation, X is a singly negatively charged anion, X' is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

56. A fuel according to claim 55, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

57. A fuel according to claim 55, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

58. A fuel according to claim 29, wherein the compound has the formula $MM'H_n$ wherein n is and integer from 1 to 3, M is an alkaline earth cation, M' is an alkali metal cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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59. A fuel according to claim 29, wherein the compound is $MM'XH_n$ wherein n is 1 to 2, M is an alkaline earth cation, M' is an alkali metal cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

60. A fuel according to claim 59, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

61. A fuel according to claim 29, wherein the compound is MM'XH where M is an alkaline earth cation, M' is an alkali metal cation, X is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

62. A fuel according to claim 61, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

63. A fuel according to claim 29, wherein the compound has the formula MM'XX'H where M is an alkaline earth cation, M' is an alkali metal cation, X and X' are each a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

64. A fuel according to claim 63, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

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65. A fuel according to claim 29, wherein the compound has the formula H_nS wherein n is 1 or 2, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species.

66. A fuel according to claim 29, wherein the compound has the formula $MSiH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species.

67. A fuel according to claim 29, wherein the compound has the formula $MXM'H_n$ wherein n is an integer from 1 to 5;

M is an alkali or alkaline earth cation;

X is a singly negatively charged anion or a doubly negatively charged anion;

M' is selected from the group consisting of Si, Al, Ni, the transition elements, the inner transition elements, and the rare earth elements; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

68. A fuel according to claim 67, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen

carbonate ions, and nitrate ions.

69. A fuel according to claim 67, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

70. A fuel according to claim 29, wherein the compound has the formula $MAlH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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71. A fuel according to claim 29, wherein the compound has the formula MH_n wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of the transition elements, the inner transition elements, and the rare earth element cations and nickel; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

72. A fuel according to claim 29, wherein the compound has the formula $MNiH_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

73. A fuel according to claim 29, wherein the compound has the formula $MM'H_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum;

M' is selected from the group consisting of the transition elements, the inner transition elements, and rare earth element cations; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

74. A fuel according to claim 29, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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75. A fuel according to claim 29, wherein the compound has the formula Si_2H_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

76. A fuel according to claim 29, wherein the compound has the formula SiH_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

77. A fuel according to claim 29, wherein the compound has the formula TiH_n wherein n is an integer from 1 to 4, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

78. A fuel according to claim 29, wherein the compound has the formula Al_2H_n wherein n is an integer from 1 to 4 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

79. A fuel according to claim 29, wherein the compound has the formula $MXAlX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the

hydrogen content H_n comprises at least one increased binding energy hydrogen species.

80. A fuel according to claim 79, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

81. A fuel according to claim 79, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

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82. A fuel according to claim 29, wherein the compound has the formula $MXSiX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

83. A fuel according to claim 82, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

84. A fuel according to claim 82, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

85. A fuel according to claim 29, wherein the compound has the formula SiO_2H_n wherein n is an integer from 1 to 6 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

86. A fuel according to claim 29, wherein the compound has the formula $MSiO_2H_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the

hydrogen content H_n comprises at least one increased binding energy hydrogen species.

87. A fuel according to claim 29, wherein the compound has the formula MSi_2H_n wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

88. A fuel according to claim 29, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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89. A fuel according to claim 29, wherein the compound is greater that 50 atomic percent pure.

90. A fuel according to claim 29, wherein the compound is greater that 90 atomic percent pure.

91. A fuel according to claim 29, wherein said at least one other element comprises at least one selected from the group consisting of a proton, ordinary hydrogen atom, ordinary hydride ions, ordinary hydrogen molecules, ordinary hydrogen molecular ions and ordinary H_3^+ ion .

92. A fuel according to claim 29, wherein said at least one other element comprises at least one element selected from the group consisting of alkaline earth metals and alkali metals .

93. A fuel according to claim 92, wherein said element comprises lithium or lithium ion.

94. A fuel according to claim 29, wherein said at least one other element comprises at least one element selected from the group consisting of organic compounds .

95. A fuel according to claim 29, wherein said at least one other element comprises at least one element selected from the group consisting of semiconductors .

96. A fuel according to claim 29, wherein said compound comprising:

(a) at least one neutral, positive or negative increased binding energy hydrogen species having a binding energy:

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies at ambient conditions, or is negative; and

(b) at least one other element, wherein said increased binding energy hydrogen species is selected from the group consisting of H_n, H_n^-, and H_n^+, where n is an integer of 1 to 8, and n is greater than 1 when H has a positive charge.

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97. A fuel according to claim 96, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (b) hydrogen atom having a binding energy greater than about 13.6 eV; (c) hydrogen molecule having a first binding energy greater than about 15.5 eV; and (d) molecular hydrogen ion having a binding energy greater than about 16.4 eV.

98. A fuel according to claim 96, wherein the increased binding energy hydrogen species comprises a hydride ion having a binding energy of about 3.0, 6.6, 11.2, 16.7, 22.8 29.3, 36.1, 42.8, 49.4, 55.5, 61.0, 65.6, 69.2, 71.53, 72.4, 71.54, 68.8, 64.0, 56.8, 47.1, 34.6, or 19.2.

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99. A fuel according to claim 96, wherein said increased binding energy hydrogen species is a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge.

100. A fuel according to claim 96, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydrino atom having a binding energy of about 13.6 eV/$(1/p)^2$, where p is an integer greater than 1; (b) a hydride ion having a binding energy represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (c) a trihydrino molecular ion, H_3^+ (1/p), having a binding energy of about $22.6/(1/p)^2$ eV; (d) a dihydrino molecule having a binding energy of about $15.5/(1/p)^2$ eV; and (e) a dihydrino molecular ion with a binding energy of about $16.4/(1/p)^2$ eV.

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101. A fuel according to claim 100, wherein p is 2 to 200.

102. A fuel according to claim 100, wherein p is 2 to 24.

103. A fuel according to claim 100, wherein said increased binding energy hydrogen species is negative.

104. A fuel according to claim 17, wherein said source of hydrino hydride ion comprises a source of 2 or more types of hydrino hydride ions.

105. A method of propelling an object comprising:

reacting at least one hydrino hydride ion with protons to form dihydrino molecules in such a manner as to impart acceleration to an object.

106. A method according to claim 105, wherein said object is a rocket.

107. A method according to claim 105, wherein said object is a projectile.

108. A method according to claim 105, wherein said reaction is initiated by heat energy.

109. A method according to claim 105, wherein said protons are supplied by a source of said protons comprising an acid.

110. A method according to claim 109, wherein said acid is a super-acid.

111. A method according to claim 109, wherein said acid is selected from the group consisting of HF, HCl, H_2SO_4, HNO_3, the reaction products of HF and SbF_5, the reaction products of HCl and Al_2Cl_6, the reaction products of H_2SO_3F and SbF_5, the reaction products of H_2SO_4 and SO_2, and combinations thereof.

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112. A method according to claim 105, wherein said protons comprise mainly H^1.

113. A method according to claim 105, wherein said protons comprise mainly H^2.

114. A method according to claim 105, wherein said protons comprise mainly H^3.

115. A method according to claim 105, wherein said reaction is initiated by a rapid mixing of said hydrino hydride ion with a source of said protons.

116. A method according to claim 115, wherein said source of protons comprises an acid.

117. A method according to claim 105, further comprising decomposing a source of said hydrino hydride ion to provide said at least one hydrino hydride ion, wherein said source of said hydrino hydride ion comprising at least one compound comprising

said least one hydrino hydride ion and at least one other element.

118. A method according to claim 117, wherein said compound comprises at least one hydrino atom having a binding energy of about $13.6/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

119. A method according to claim 117, wherein said compound comprises at least one dihydrino molecule having a first binding energy of about $15.5/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

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120. A method according to claim 117, wherein said compound comprises at least one dihydrino molecular ion having a first binding energy of about $16.4/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1, and at least one other element.

121. A method according to claim 117, wherein said compound comprises a hydrino hydride ion having a binding energy of about 0.65 eV and at least one other element.

122. A method according to claim 117, wherein the compound further comprises one or more selected from the group consisting of ordinary hydrogen molecules, ordinary hydride ions, ordinary hydrogen atoms, protons, ordinary hydrogen molecular ions, and ordinary H^{3+}ions; and said method further comprises decomposing said compound to provide said hydrino hydride ion and protons.

123. A method according to claim 117, wherein the compound has a formula selected from the group of formulae consisting of MH, MH_2, and M_2H_2 wherein M is an alkali

cation and H is selected from the group consisting of increased binding energy hydride ions, hydrino atoms and dihydrino molecules, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

124. A method according to claim 117, wherein the compound has the formula MH_n wherein n is 1 or 2, M is an alkaline earth cation and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

125. A method according to claim 117, wherein the compound has the formula MHX wherein M is an alkali cation, X is one of a neutral atom, a molecule, or a singly negatively charged anion, and H is elected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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126. A method according to claim 125, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

127. A method according to claim 117, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

128. A method according to claim 127, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

129. A method according to claim 117, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a doubly negatively charged anion, and H is a hydrino atom, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

130. A compound according to claim 129, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

131. A method according to claim 117, wherein the compound has the formula M_2HX wherein M is an alkali cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

132. A method according to claim 131, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

133. A method according to claim 117, wherein the compound has the formula MH_n wherein n is an integer from 1 to 5, M is an alkali cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

134. A method according to claim 117, wherein the compound has the formula M_2H_n wherein n is an integer from 1 to 4, M is an alkaline earth cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

135. A method according to claim 117, wherein the compound has the formula M_2XH_n wherein n is an integer from 1 to 3, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

136. A method according to claim 135, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

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137. A method according to claim 117, wherein the compound has the formula $M_2X_2H_n$ wherein n is 1 or 2, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

138. A method according to claim 137, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

139. A method according to claim 117, wherein the compound has the formula M_2X_3H wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

140. A method according to claim 139, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen

carbonate ions, and nitrate ions.

141. A method according to claim 117, wherein the compound has the formula M_2XH_n wherein n is 1 or 2, M is an alkaline earth cation, X is a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

142. A method according to claim 141, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

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143. A method according to claim 117, wherein the compound has the formula $M_2XX'H$ wherein M is an alkaline earth cation, X is a singly negatively charged anion, X' is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

144. A method according to claim 143, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

145. A method according to claim 143, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

146. A method according to claim 117, wherein the compound has the formula $MM'H_n$ wherein n is and integer from 1 to 3, M is an alkaline earth cation, M' is an alkali metal cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

147. A method according to claim 117, wherein the compound is $MM'XH_n$ wherein n is 1 to 2, M is an alkaline earth cation, M' is an alkali metal cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

148. A method according to claim 147, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

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149. A method according to claim 117, wherein the compound is MM'XH where M is an alkaline earth cation, M' is an alkali metal cation, X is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

150. A method according to claim 149, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

151. A method according to claim 117, wherein the compound has the formula MM'XX'H where M is an alkaline earth cation, M' is an alkali metal cation, X and X' are each a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

152. A method according to claim 151, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

153. A method according to claim 117, wherein the compound has the formula H_nS wherein n is 1 or 2, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

154. A method according to claim 117, wherein the compound has the formula $MSiH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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155. A method according to claim 117, wherein the compound has the formula $MXM'H_n$ wherein n is an integer from 1 to 5;

M is an alkali or alkaline earth cation;

X is a singly negatively charged anion or a doubly negatively charged anion;

M' is selected from the group consisting of Si, Al, Ni, the transition elements, the inner transition elements, and the rare earth elements; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

156. A method according to claim 155, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

157. A method according to claim 155, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

158. A method according to claim 117, wherein the compound has the formula $MAlH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

159. A method according to claim 117, wherein the compound has the formula MH_n wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of the transition elements, the inner transition elements, and the rare earth element cations and nickel; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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160. A method according to claim 117, wherein the compound has the formula $MNiH_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

161. A method according to claim 117, wherein the compound has the formula $MM'H_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum;

M' is selected from the group consisting of the transition elements, the inner transition elements, and rare earth element cations; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

162. A method according to claim 117, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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163. A method according to claim 117, wherein the compound has the formula Si_2H_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

164. A method according to claim 117, wherein the compound has the formula SiH_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

165. A method according to claim 117, wherein the compound has the formula TiH_n wherein n is an integer from 1 to 4, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

166. A method according to claim 117, wherein the compound has the formula Al_2H_n wherein n is an integer from 1 to 4 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises

decomposing said compound to provide said hydrino hydride ion.

167. A method according to claim 117, wherein the compound has the formula $MXAlX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

168. A method according to claim 167, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

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169. A method according to claim 167, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

170. A method according to claim 117, wherein the compound has the formula $MXSiX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

171. A method according to claim 170, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

172. A method according to claim 170, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

173. A method according to claim 117, wherein the compound has the formula SiO_2H_n wherein n is an integer from 1 to 6 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

174. A method according to claim 117, wherein the compound has the formula $MSiO_2H_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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175. A method according to claim 117, wherein the compound has the formula MSi_2H_n wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

176. A method according to claim 117, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

177. A method according to claim 117, wherein the compound is greater that 50 atomic percent pure.

178. A method according to claim 117, wherein the compound is greater that 90 atomic

percent pure.

179. A method according to claim 117, wherein said at least one other element comprises at least one selected from the group consisting of a proton, ordinary hydride ion, ordinary hydrogen atom, ordinary hydrogen molecules, ordinary hydrogen molecular ions and ordinary H_3^+ ions and said method further comprises decomposing said compound to provide said hydrino hydride ion.

180. A method according to claim 117, wherein said at least one other element comprises at least one element selected from the group consisting of alkaline earth metals and alkali metals and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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181. A method according to claim 180, wherein said element comprises lithium or lithium ion.

182. A method according to claim 117, wherein said at least one other element comprises at least one element selected from the group consisting of organic compounds and said method further comprises decomposing said compound to provide said hydrino hydride ion.

183. A method according to claim 117, wherein said at least one other element comprises at least one element selected from the group consisting of semiconductors and said method further comprises decomposing said compound to provide said hydrino hydride ion.

184. A method according to claim 117, wherein said compound comprising:

(a) at least one neutral, positive or negative increased binding energy hydrogen species having a binding energy:

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies at ambient conditions, or is negative; and

(b) at least one other element, wherein said increased binding energy hydrogen species is selected from the group consisting of H_n, H_n^-, and H_n^+, where n is an integer of 1 to 8, and n is greater than 1 when H has a positive charge.

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185. A method according to claim 184, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and *e* is the elementary charge; (b) hydrogen atom having a binding energy greater than about 13.6 eV; (c) hydrogen molecule having a first binding energy greater than about 15.5 eV; and (d) molecular hydrogen ion having a binding energy greater than about 16.4 eV.

186. A method according to claim 184, wherein the increased binding energy hydrogen

species comprises a hydride ion having a binding energy of about 3.0, 6.6, 11.2, 16.7, 22.8 29.3, 36.1, 42.8, 49.4, 55.5, 61.0, 65.6, 69.2, 71.53, 72.4, 71.54, 68.8, 64.0, 56.8, 47.1, 34.6, or 19.2.

187. A method according to claim 184, wherein said increased binding energy hydrogen species is a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

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$$\textit{Binding Energy} = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and *e* is the elementary charge.

188. A method according to claim 184, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydrino atom having a binding energy of about 13.6 eV/$(1/p)^2$, where p is an integer greater than 1; (b) a hydride ion having a binding energy represented by

$$\textit{Binding Energy} = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and *e* is the elementary charge; (c) a trihydrino molecular ion, H_3^+ (1/p), having a binding energy of about $22.6/(1/p)^2$ eV; (d) a dihydrino molecule having a binding energy of about $15.5/(1/p)^2$ eV; and (e) a dihydrino molecular ion with a binding energy of about $16.4/(1/p)^2$ eV.

189. A method according to claim 188, wherein p is 2 to 200.

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190. A method according to claim 188, wherein p is 2 to 24.

191. A method according to claim 188, wherein said increased binding energy hydrogen species is negative.

192. A method according to claim 105, wherein said at least one hydrino hydride ion comprises a mixture of 2 or more types of hydrino hydride ions.

193. A method according to claim 105, further comprising reacting hydrino atoms with electrons to produce said hydrino hydride ion.

194. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst having a net enthalpy of reaction of at least m27 eV, where m is an integer.

195. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst adapted to provide a resonant absorption with the energy released by said hydrogen atoms when said hydrogen atoms undergo a transition to a lower energy state.

196. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising a salt of rubidium.

197. A method according to claim 196, wherein said salt of rubidium is selected from the group consisting of RbOH, Rb_2SO_4, Rb_2CO_3, and Rb_3PO_4.

198. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising a salt of potassium.

199. A method according to claim 198, wherein said salt of potassium is selected from the group consisting of KOH, K_2SO_4, K_2CO_3 and K_3PO_4.

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200. A method according to claim 198, wherein said salt of potassium is K_2CO_3.

201. A method according to claim 193, further comprising forming hydrino atoms from hydrogen atoms by use of a catalyst comprising a salt of titanium.

202. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising an ion selected from the group consisting of (Rb^+), (Mo^{2+}), and (Ti^{2+}).

203. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst selected from the group consisting of (Al^{2+}), (Ar^+), (Ti^{2+}), (As^{2+}), (Rb^+), (Mo^{2+}), (Ru^{2+}), (In^{2+}), and (Te^{2+}).

204. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst capable of providing a net enthalpy of reaction in the range of 26.8 to 28.5 eV.

205. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair of ions selected from the group consisting of: (Sn^{4+}, Si^{4+}), (Pr^{3+}, Ca^{2+}), (Sr^{2+}, Cr^{2+}), (Cr^{3+}, Tb^{3+}), (Sb^{3+},Co^{2+}), (Bi^{3+}, Ni^{2+}), (Pd^{2+}, In^{+}), (La^{3+}, Dy^{3+}), (La^{3+}, Ho^{3+}), (K^{+}, K^{+}) , (V^{3+}, Pd^{2+}), (Lu^{3+}, Zn^{2+}), (As^{3+}, Ho^{3+}), (Mo^{5+}, Sn^{4+}), (Sb^{3+}, Cd^{2+}), (Ag^{2+},Ag^{+}), (La^{3+}, Er^{3+}), (V^{4+}, B^{3+}), (Fe^{3+}, Ti^{3+}), (Co^{2+}, Ti^{+}), (Bi^{3+}, Zn^{2+}), (As^{3+}, Dy^{3+}), (Ho^{3+}, Mg^{2+}), (K^{+}, Rb^{+}), (Cr^{3+}, Pr^{3+}), (Sr^{2+}, Fe^{2+}), (Ni^{2+}, Cu^{+}), (Li^{+}, Pb^{2+}), (Sr^{2+}, Mo^{2+}), (Y^{3+}, Zr^{4+}), (Cd^{2+}, Ba^{2+}), (Ho^{3+}, Pb^{2+}), (Eu^{3+}, Mg^{2+}), (Er^{3+}, Mg^{2+}), (Bi^{4+}, Al^{3+}), (Ca^{2+}, Sm^{3+}), (V^{3+}, La^{3+}), (Gd^{3+}, Cr^{2+}), (Mn^{2+}, Ti^{+}), (Yb^{3+}, Fe^{2+}), (Ni^{2+}, Ag^{+}), (Zn^{2+}, Yb^{2+}), (Se^{4+}, Sn^{4+}), (Sb^{3+}, Bi^{2+}), and (Eu^{3+}, Pb^{2+}).

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206. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising oxygen in combination with at least one atom selected from the group consisting of Cu, As, Pd, Te, Cs and Pt.

207. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair selected from the group consisting of: (B, Li^{+}), (S, Li^{+}), (Br, Li^{+}), (Pm^{+}, Li^{+}), (Sm^{+}, Li^{+}), (Tb^{+}, Li^{+}), (Dy^{+}, Li^{+}), (Sb^{+}, H^{+}) and (Bi^{+}, H^{+}).

208. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair selected from the group consisting of:

(He 0+ , Co 3+);	(O 1+ , Nd 4+);	(Al 2+ , Cl 5+);
(He 0+ , Ga 3+);	(O 1+ , Tb 4+);	(Al 4+ , Mn 8+);
(Li 0+ , Ni 3+);	(O 2+ , Ne 3+);	(Si 1+ , Mg 2+);
(Li 0+ , Xe 3+);	(O 3+ , Sb 6+);	(Si 1+ , V 2+);
(Li 0+ , Hg 3+);	(O 4+ , Fe 7+);	(Si 1+ , Tc 2+);
(Li 1+ , Na 4+);	(F 0+ , Al 2+);	(Si 1+ , Sn 2+);
(Li 1+ , Y 6+);	(F 0+ , Si 2+);	(Si 1+ , Hf 2+);
(Be 1+ , Bi 6+);	(F 0+ , Fe 2+);	(Si 1+ , Pb 2+);
(Be 2+ , Al 6+);	(F 0+ , Co 2+);	(Si 2+ , Co 3+);
(B 1+ , C 2+);	(F 0+ , Ru 2+);	(Si 2+ , Ga 3+);

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(B 1+ , K 2+);
(B 1+ , Ho 3+);
(B 1+ , Er 3+);
(B 1+ , Tm 3+);
(B 1+ , Lu 3+);
(C 1+ , N 2+);
(C 1+ , V 3+);
(C 1+ , Tc 3+);
(C 1+ , Ru 3+);
(C 1+ , Sn 3+);
(C 2+ , Mn 4+);
(C 2+ , Co 4+);
(N 0+ , Sr 2+);
(N 0+ , La 2+);
(N 0+ , Ce 2+);
(N 0+ , Pr 2+);
(N 0+ , Nd 2+);
(N 0+ , Pm 2+);
(N 0+ , Sm 2+);
(N 0+ , Eu 2+);
(N 1+ , O 2+);
(N 1+ , Si 3+);
(N 1+ , P 3+);
(N 1+ , Mn 3+);
(N 1+ , Rh 3+);
(N 2+ , F 3+);
(N 3+ , Br 6+);
(O 0+ , Ti 2+);
(O 0+ , V 2+);
(O 0+ , Nb 2+);
(O 0+ , Hf 2+);
(O 1+ , Ne 2+);
(O 1+ , Ca 3+);
(Cl 2+ , Ho 4+);
(Cl 2+ , Er 4+);
(Cl 3+ , Cl 4+);
(Cl 5+ , Ni 6+);
(Cl 5+ , Cu 6+);
(Cl 5+ , Rb 7+);
(Ar 0+ , Ba 2+);
(Ar 0+ , Ce 2+);
(Ar 0+ , Pr 2+);
(Ar 0+ , Nd 2+);
(Ar 0+ , Ra 2+);
(Ar 1+ , Ti 3+);
(Ar 2+ , C 3+);
(Ar 3+ , K 4+);
(Ar 3+ , Br 5+);
(Ar 3+ , Mo 5+);
(Ar 4+ , Y 5+);
(F 0+ , In 2+);
(F 0+ , Sb 2+);
(F 0+ , Bi 2+);
(F 1+ , Sb 4+);
(F 3+ , Fe 6+);
(Ne 0+ , Sm 3+);
(Ne 0+ , Dy 3+);
(Ne 0+ , Ho 3+);
(Ne 0+ , Er 3+);
(Ne 0+ , Lu 3+);
(Ne 1+ , N 3+);
(Ne 1+ , K 3+);
(Ne 1+ , V 4+);
(Ne 2+ , O 4+);
(Na 0+ , Al 2+);
(Na 0+ , Si 2+);
(Na 0+ , Fe 2+);
(Na 0+ , Co 2+);
(Na 0+ , Ru 2+);
(Na 0+ , In 2+);
(Na 0+ , Sb 2+);
(Na 0+ , Bi 2+);
(Na 2+ , Ti 5+);
(Na 2+ , Kr 6+);
(Na 3+ , Y 7+);
(Mg 1+ , Rb 3+);
(Mg 1+ , Eu 4+);
(Mg 3+ , Ne 5+);
(Mg 6+ , Cl 8+);
(Al 1+ , Sc 2+);
(Al 1+ , Zr 2+);
(Al 1+ , Lu 2+);
(Al 2+ , S 5+);
(Sc 4+ , N 5+);
(Ti 2+ , Ar 2+);
(Ti 2+ , Mo 3+);
(Ti 4+ , O 5+);
(Ti 4+ , Zn 6+);
(Ti 4+ , As 6+);
(V 1+ , Sr 2+);
(V 1+ , La 2+);
(V 1+ , Ce 2+);
(V 1+ , Pr 2+);
(V 1+ , Nd 2+);
(V 1+ , Pm 2+);
(V 1+ , Sm 2+);
(V 1+ , Eu 2+);
(V 2+ , O 2+);
(V 3+ , Mn 4+);
(V 3+ , Co 4+);
(Si 2+ , Ge 3+);
(Si 2+ , Tl 3+);
(Si 3+ , Ni 6+);
(Si 3+ , Rb 7+);
(Si 4+ , Al 6+);
(P 1+ , Mg 2+);
(P 1+ , Tc 2+);
(P 1+ , Sn 2+);
(P 1+ , Hf 2+);
(P 1+ , Pb 2+);
(P 2+ , Ni 3+);
(P 2+ , Cd 3+);
(P 2+ , Xe 3+);
(P 3+ , Nb 5+);
(P 5+ , C 5+);
(S 1+ , P 2+);
(S 1+ , Se 2+);
(S 1+ , La 3+);
(S 1+ , Ce 3+);
(S 1+ , Au 2+);
(S 2+ , Sr 3+);
(S 2+ , Cd 3+);
(S 3+ , Cu 4+);
(S 3+ , Rb 4+);
(S 4+ , O 4+);
(Cl 1+ , C 2+);
(Cl 1+ , K 2+);
(Cl 1+ , Zr 3+);
(Cl 1+ , Eu 3+);
(Cl 1+ , Tm 3+);
(Cl 2+ , Te 4+);
(Cl 2+ , Sm 4+);
(Cl 2+ , Gd 4+);
(Mn 4+ , Ge 5+);
(Fe 1+ , Sc 2+);
(Fe 1+ , Y 2+);
(Fe 1+ , Yb 2+);
(Fe 1+ , Lu 2+);
(Fe 2+ , S 3+);
(Fe 2+ , Cu 3+);
(Fe 2+ , Zn 3+);
(Fe 2+ , Br 3+);
(Fe 2+ , Zr 4+);
(Fe 2+ , Ce 4+);
(Fe 5+ , Sr 7+);
(Co 1+ , Mg 2+);
(Co 1+ , Cr 2+);
(Co 1+ , Mn 2+);
(Co 1+ , Mo 2+);
(Co 1+ , Tc 2+);

(K 1+ , Si 3+);
(K 1+ , P 3+);
(K 1+ , Mn 3+);
(K 1+ , Ge 3+);
(K 1+ , Rh 3+);
(K 1+ , Tl 3+);
(K 2+ , He 2+);
(K 2+ , Si 4+);
(K 2+ , As 4+);
(K 3+ , P 5+);
(K 3+ , Zr 5+);
(K 4+ , Rb 6+);
(K 5+ , Mg 4+);
(K 5+ , Kr 7+);
(K 6+ , Y 8+);
(Ca 1+ , C 2+);
(Ca 1+ , Sm 3+);
(Ca 1+ , Dy 3+);
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(Ca 1+ , Ho 3+);
(Ca 1+ , Er 3+);
(Ca 1+ , Tm 3+);
(Ca 1+ , Lu 3+);
(Ca 2+ , O 3+);
(Ca 2+ , Ni 4+);
(Ca 3+ , Mn 5+);
(Ca 3+ , Rb 5+);
(Ca 4+ , Cl 6+);
(Ca 4+ , Ar 6+);
(Ca 4+ , Sc 5+);
(Ca 5+ , Y 7+);
(Sc 2+ , Ti 4+);
(Sc 2+ , Bi 4+);
(Cu 4+ , Rb 6+);
(Cu 5+ , Mn 7+);
(Zn 1+ , P 2+);
(Zn 1+ , I 2+);
(Zn 1+ , La 3+);
(Zn 1+ , Au 2+);
(Zn 1+ , Hg 2+);
(Zn 2+ , Ti 4+);
(Zn 2+ , Sn 4+);
(Zn 2+ , Bi 4+);
(Zn 3+ , As 5+);
(Zn 4+ , Sr 6+);
(Zn 5+ , Mn 7+);
(Zn 6+ , Mo 8+);
(Ga 1+ , Cr 2+);
(Ga 1+ , Mn 2+);
(Ga 1+ , Fe 2+);
(Ga 1+ , Ge 2+);
(V 4+ , Ar 6+);
(V 4+ , Sc 5+);
(V 5+ , Mg 5+);
(V 6+ , Sc 8+);
(V 6+ , Br 8+);
(Cr 1+ , Sc 2+);
(Cr 1+ , Ti 2+);
(Cr 1+ , Zr 2+);
(Cr 1+ , Lu 2+);
(Cr 2+ , F 2+);
(Cr 2+ , Na 2+);
(Cr 2+ , Se 3+);
(Cr 2+ , Pd 3+);
(Cr 2+ , I 3+);
(Cr 2+ , Hg 3+);
(Cr 3+ , O 3+);
(Cr 3+ , Ni 4+);
(Cr 4+ , O 4+);
(Cr 5+ , Ne 5+);
(Cr 5+ , Fe 7+);
(Mn 1+ , V 2+);
(Mn 1+ , Nb 2+);
(Mn 1+ , Sn 2+);
(Mn 1+ , Hf 2+);
(Mn 2+ , Cu 3+);
(Mn 2+ , Zn 3+);
(Mn 2+ , Br 3+);
(Mn 2+ , Zr 4+);
(Mn 2+ , Ce 4+);
(Mn 2+ , Hf 4+);
(Mn 3+ , Mg 3+);
(Mn 3+ , Te 5+);
(Se 1+ , Fe 2+);
(Se 1+ , Co 2+);
(Se 1+ , Ge 2+);
(Se 1+ , Ru 2+);
(Se 1+ , In 2+);
(Se 1+ , Bi 2+);
(Se 2+ , Te 3+);
(Se 3+ , Br 4+);
(Se 5+ , Y 7+);
(Br 1+ , P 2+);
(Br 1+ , I 2+);
(Br 1+ , La 3+);
(Br 1+ , Au 2+);
(Br 3+ , He 2+);
(Br 3+ , Si 4+);
(Br 3+ , Ge 4+);
(Br 4+ , S 5+);
(Br 4+ , Cl 5+);
(Co 1+ , Pb 2+);
(Co 2+ , Cu 3+);
(Co 2+ , Zn 3+);
(Co 2+ , Br 3+);
(Co 2+ , Zr 4+);
(Co 2+ , Ag 3+);
(Co 2+ , Ce 4+);
(Co 2+ , Hf 4+);
(Co 4+ , Nb 6+);
(Co 5+ , Sc 6+);
(Ni 1+ , Co 2+);
(Ni 1+ , Ni 2+);
(Ni 1+ , Rh 2+);
(Ni 1+ , Cd 2+);
(Ni 1+ , Sb 2+);
(Ni 2+ , Ne 2+);
(Ni 2+ , Ca 3+);
(Ni 2+ , Nd 4+);
(Ni 2+ , Tb 4+);
(Ni 4+ , Rb 6+);
(Ni 6+ , Ar 8+);
(Cu 1+ , Ag 2+);
(Cu 1+ , I 2+);
(Cu 1+ , Cs 2+);
(Cu 1+ , Au 2+);
(Cu 1+ , Hg 2+);
(Cu 2+ , Sm 4+);
(Cu 2+ , Gd 4+);
(Cu 2+ , Dy 4+);
(Cu 3+ , K 4+);
(Cu 3+ , Br 5+);
(Cu 3+ , Mo 5+);
(Sr 1+ , Ga 2+);
(Sr 1+ , Te 2+);
(Sr 1+ , Pt 2+);
(Sr 1+ , Tl 2+);
(Sr 2+ , C 3+);
(Sr 2+ , Mo 4+);
(Sr 3+ , Ar 4+);
(Sr 3+ , Sr 4+);
(Sr 3+ , Sb 5+);
(Sr 3+ , Bi 5+);
(Sr 4+ , Ar 5+);
(Sr 4+ , Cu 5+);
(Y 2+ , Sr 3+);
(Y 2+ , Cd 3+);
(Y 3+ , Se 5+);
(Y 3+ , Pb 5+);
(Y 4+ , Ti 5+);
(Y 4+ , Zn 5+);

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(Ga 1+ , Mo 2+);
(Ga 1+ , Ru 2+);
(Ga 1+ , Bi 2+);
(Ga 2+ , Rb 3+);
(Ga 2+ , Eu 4+);
(Ga 2+ , Tm 4+);
(Ge 1+ , Mg 2+);
(Ge 1+ , Mn 2+);
(Ge 1+ , Tc 2+);
(Ge 1+ , Sn 2+);
(Ge 1+ , Pb 2+);
(Ge 2+ , F 2+);
(Ge 2+ , Na 2+);
(Ge 2+ , Se 3+);
(Ge 2+ , Pd 3+);
(Ge 2+ , I 3+);
(Ge 3+ , V 5+);
(Ge 3+ , Se 5+);
(Ge 3+ , Pb 5+);
(As 1+ , Sc 2+);
(As 1+ , Y 2+);
(As 1+ , Zr 2+);
(As 1+ , Lu 2+);
(As 2+ , Co 3+);
(As 2+ , Ga 3+);
(As 2+ , Ge 3+);
(As 2+ , Tl 3+);
(As 3+ , Fe 4+);
(As 4+ , Sb 6+);
(Se 1+ , Al 2+);
(Se 1+ , Si 2+);
(Tc 1+ , Sr 2+);
(Tc 1+ , La 2+);
(Tc 1+ , Ce 2+);
(Tc 1+ , Pm 2+);
(Tc 1+ , Sm 2+);
(Tc 1+ , Eu 2+);
(Tc 1+ , Tb 2+);
(Tc 1+ , Dy 2+);
(Ru 1+ , Ca 2+);
(Ru 1+ , Eu 2+);
(Ru 1+ , Tb 2+);
(Ru 1+ , Dy 2+);
(Ru 1+ , Ho 2+);
(Ru 1+ , Er 2+);
(Rh 1+ , V 2+);
(Rh 1+ , Nb 2+);
(Rh 1+ , Sn 2+);
(Rh 1+ , Hf 2+);
(Pd 1+ , Al 2+);

(Br 5+ , Sb 6+);
(Br 6+ , Ar 8+);
(Kr 1+ , B 2+);
(Kr 1+ , S 2+);
(Kr 1+ , Br 2+);
(Kr 1+ , Xe 2+);
(Kr 1+ , Nd 3+);
(Kr 1+ , Pm 3+);
(Kr 1+ , Tb 3+);
(Kr 2+ , Kr 3+);
(Kr 2+ , Tb 4+);
(Kr 3+ , O 3+);
(Kr 3+ , Ni 4+);
(Kr 3+ , Kr 4+);
(Kr 3+ , Nb 5+);
(Kr 4+ , Zr 5+);
(Kr 5+ , Sr 6+);
(Kr 6+ , Y 7+);
(Rb 1+ , Nb 3+);
(Rb 2+ , Te 4+);
(Rb 2+ , Sm 4+);
(Rb 2+ , Gd 4+);
(Rb 2+ , Dy 4+);
(Rb 2+ , Ho 4+);
(Rb 2+ , Er 4+);
(Rb 3+ , Mg 3+);
(Rb 3+ , Te 5+);
(Rb 5+ , Rb 6+);
(Rb 6+ , Te 7+);
(Sr 1+ , Be 2+);
(Sr 1+ , Zn 2+);
(Sn 1+ , Er 2+);
(Sn 2+ , N 2+);
(Sn 2+ , Ar 2+);
(Sn 2+ , V 3+);
(Sn 2+ , Mo 3+);
(Sn 3+ , Mn 4+);
(Sn 3+ , Fe 4+);
(Sn 3+ , Co 4+);
(Sb 2+ , Ti 3+);
(Sb 2+ , Sb 3+);
(Sb 2+ , Bi 3+);
(Sb 3+ , C 3+);
(Te 1+ , Sc 2+);
(Te 1+ , Y 2+);
(Te 1+ , Gd 2+);
(Te 1+ , Tm 2+);
(Te 1+ , Yb 2+);
(Te 1+ , Lu 2+);
(Te 2+ , Sc 3+);

(Y 5+ , Co 6+);
(Y 6+ , K 7+);
(Zr 2+ , P 2+);
(Zr 2+ , Ag 2+);
(Zr 2+ , I 2+);
(Zr 2+ , Cs 2+);
(Zr 2+ , La 3+);
(Zr 2+ , Au 2+);
(Zr 2+ , Hg 2+);
(Nb 2+ , C 2+);
(Nb 2+ , K 2+);
(Nb 2+ , Zr 3+);
(Nb 2+ , Eu 3+);
(Nb 2+ , Tm 3+);
(Nb 2+ , Lu 3+);
(Nb 3+ , Kr 3+);
(Nb 3+ , Pr 4+);
(Nb 3+ , Tb 4+);
(Nb 4+ , N 4+);
(Mo 1+ , Ba 2+);
(Mo 1+ , Pr 2+);
(Mo 1+ , Nd 2+);
(Mo 1+ , Ra 2+);
(Mo 2+ , Ru 3+);
(Mo 2+ , Sn 3+);
(Mo 3+ , Cr 4+);
(Mo 3+ , Ge 4+);
(Mo 4+ , Bi 5+);
(Mo 5+ , Mn 6+);
(Mo 6+ , O 6+);
(Mo 6+ , Cr 7+);
(Pr 2+ , Xe 2+);
(Pr 2+ , Pr 3+);
(Pr 2+ , Nd 3+);
(Pr 2+ , Pm 3+);
(Pr 2+ , Gd 3+);
(Pr 2+ , Tb 3+);
(Nd 2+ , Sm 3+);
(Nd 2+ , Dy 3+);
(Nd 2+ , Ho 3+);
(Nd 2+ , Er 3+);
(Nd 2+ , Lu 3+);
(Pm 2+ , C 2+);
(Pm 2+ , K 2+);
(Pm 2+ , Zr 3+);
(Pm 2+ , Eu 3+);
(Pm 2+ , Tm 3+);
(Sm 2+ , Cl 2+);
(Sm 2+ , Sc 3+);
(Sm 2+ , Yb 3+);

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(Pd 1+ , Si 2+);
(Pd 1+ , Fe 2+);
(Pd 1+ , Co 2+);
(Pd 1+ , Ru 2+);
(Pd 1+ , In 2+);
(Pd 1+ , Sb 2+);
(Pd 1+ , Bi 2+);
(Ag 1+ , Cu 2+);
(Ag 1+ , As 2+);
(Ag 1+ , Ag 2+);
(Ag 1+ , Cs 2+);
(Ag 1+ , Hg 2+);
(Cd 1+ , Zn 2+);
(Cd 1+ , Ga 2+);
(Cd 1+ , Cd 2+);
(Cd 1+ , Tl 2+);
(In 1+ , Sc 2+);
(In 1+ , Y 2+);
(In 1+ , Yb 2+);
(In 1+ , Lu 2+);
(In 2+ , Sr 3+);
(In 2+ , Cd 3+);
(Sn 1+ , Ca 2+);
(Sn 1+ , Sr 2+);
(Sn 1+ , La 2+);
(Sn 1+ , Sm 2+);
(Sn 1+ , Eu 2+);
(Sn 1+ , Tb 2+);
(Sn 1+ , Dy 2+);
(Sn 1+ , Ho 2+);
(Lu 2+ , Hf 3+);
(Hf 2+ , As 2+);
(Hf 2+ , Ag 2+);
(Hf 2+ , I 2+);
(Hf 2+ , Cs 2+);
(Hf 2+ , Hg 2+);
(Hg 1+ , Al 2+);
(Hg 1+ , Si 2+);
(Hg 1+ , Co 2+);
(Hg 1+ , Ni 2+);
(Hg 1+ , Rh 2+);
(Hg 1+ , Cd 2+);
(Hg 1+ , In 2+);
(Hg 1+ , Sb 2+);
(Te 2+ , Kr 2+);
(Te 2+ , Yb 3+);
(Te 2+ , Hf 3+);
(Te 3+ , Ar 3+);
(Te 3+ , La 4+);
(Te 3+ , Yb 4+);
(Te 4+ , Bi 5+);
(I 1+ , Al 2+);
(I 1+ , Si 2+);
(I 1+ , Fe 2+);
(I 1+ , Co 2+);
(I 1+ , Ge 2+);
(I 1+ , Ru 2+);
(I 1+ , In 2+);
(I 1+ , Bi 2+);
(Xe 1+ , Al 2+);
(Xe 1+ , Co 2+);
(Xe 1+ , Ni 2+);
(Xe 1+ , Rh 2+);
(Xe 1+ , Cd 2+);
(Xe 1+ , Sb 2+);
(La 2+ , Ti 3+);
(La 2+ , Sb 3+);
(Ce 2+ , Ag 2+);
(Ce 2+ , I 2+);
(Ce 2+ , Cs 2+);
(Ce 2+ , Au 2+);
(Ce 2+ , Hg 2+);
(Pr 2+ , B 2+);
(Pr 2+ , Y 3+);
(Pb 2+ , As 3+);
(Pb 2+ , In 3+);
(Pb 2+ , Te 3+);
(Pb 2+ , Pb 3+);
(Pb 3+ , Br 4+);
(Bi 1+ , Ba 2+);
(Bi 2+ , Ar 2+);
(Bi 2+ , Mo 3+);
(Bi 3+ , Se 4+);
(Bi 3+ , Mo 4+);
(Bi 3+ , Pb 4+);
(Bi 4+ , P 5+);
(Bi 4+ , Kr 5+);
(Bi 4+ , Zr 5+);
(Eu 2+ , Nb 3+);
(Gd 2+ , Cl 2+);
(Gd 2+ , Sc 3+);
(Gd 2+ , Eu 3+);
(Gd 2+ , Yb 3+);
(Tb 2+ , B 2+);
(Tb 2+ , S 2+);
(Tb 2+ , Br 2+);
(Tb 2+ , Xe 2+);
(Tb 2+ , Sm 3+);
(Tb 2+ , Tb 3+);
(Tb 2+ , Dy 3+);
(Tb 2+ , Ho 3+);
(Tb 2+ , Er 3+);
(Dy 2+ , Cl 2+);
(Dy 2+ , K 2+);
(Dy 2+ , Zr 3+);
(Dy 2+ , Eu 3+);
(Dy 2+ , Yb 3+);
(Ho 2+ , Sc 3+);
(Ho 2+ , Yb 3+);
(Ho 2+ , Hf 3+);
(Er 2+ , Sc 3+);
(Er 2+ , Yb 3+);
(Er 2+ , Hf 3+);
(Tm 2+ , Kr 2+);
(Tm 2+ , Nb 3+);
(Tm 2+ , Hf 3+);
(Yb 2+ , Ti 3+);
(Lu 2+ , Kr 2+);
(Tl 1+ , Mg 2+);
(Tl 1+ , Mn 2+);
(Tl 1+ , Mo 2+);
(Tl 1+ , Tc 2+);
(Tl 1+ , Sn 2+);
(Tl 1+ , Pb 2+);
(Pb 1+ , Sc 2+);
(Pb 1+ , Y 2+);
(Pb 1+ , Lu 2+); and
(Pb 2+ , Fe 3+).

209. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one free atom selected from the group consisting of Be, Cu, Zn, Pd, Te and Pt.

210. A method according to claim 193, further comprising forming hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one set of two species selected from the group consisting of:

(Li 0+ , Ar 5+);	(P 1+ , Nd 4+);	(Ti 2+ , As 5+);
(Li 0+ , Mo 6+);	(P 1+ , Tb 4+);	(Ti 2+ , Se 5+);
(Be 0+ , Kr 5+);	(P 3+ , Na 5+);	(V 1+ , Cd 3+);
(B 0+ , Sc 3+);	(S 0+ , Sm 3+);	(V 1+ , I 3+);
(B 0+ , Zr 3+);	(S 0+ , Dy 3+);	(V 1+ , Hg 3+);
(B 0+ , Yb 3+);	(S 0+ , Ho 3+);	(V 2+ , Kr 4+);
(C 0+ , Te 3+);	(S 0+ , Er 3+);	(V 2+ , Nb 5+);
(C 0+ , Tl 3+);	(S 0+ , Lu 3+);	(V 4+ , Ni 7+);
(N 0+ , Ag 3+);	(S 1+ , Nb 4+);	(V 4+ , Kr 8+);
(N 0+ , Cd 3+);	(S 1+ , Ho 4+);	(Cr 1+ , S 3+);
(N 0+ , Hg 3+);	(S 1+ , Er 4+);	(Cr 1+ , Ca 3+);
(N 1+ , Bi 5+);	(S 1+ , Tm 4+);	(Cr 3+ , Be 3+);
(N 2+ , Br 6+);	(S 2+ , Bi 5+);	(Cr 3+ , Zn 5+);
(N 2+ , Kr 6+);	(Cl 0+ , Ti 3+);	(Cr 5+ , Cu 8+);
(O 0+ , Cl 3+);	(Cl 1+ , Mo 4+);	(Mn 1+ , Nd 4+);
(O 0+ , Kr 3+);	(Cl 1+ , Pb 4+);	(Mn 1+ , Tb 4+);
(O 0+ , Sm 4+);	(Cl 3+ , Sc 5+);	(Mn 2+ , Ca 4+);
(O 0+ , Dy 4+);	(Cl 4+ , Br 7+);	(Mn 3+ , Nb 6+);
(O 2+ , Na 4+);	(Ar 0+ , Mn 3+);	(Mn 5+ , Ca 8+);
(O 2+ , Cl 6+);	(Ar 0+ , As 3+);	(Fe 1+ , Nd 4+);
(O 2+ , Mn 6+);	(Ar 0+ , Rh 3+);	(Fe 1+ , Pm 4+);
(O 3+ , Al 5+);	(Ar 0+ , Tl 3+);	(Fe 1+ , Tb 4+);
(F 0+ , Bi 4+);	(Ar 1+ , Mn 4+);	(Fe 3+ , Ne 4+);
(F 1+ , Mn 5+);	(Ar 1+ , In 4+);	(Fe 5+ , Mo 8+);
(F 3+ , Mg 5+);	(Ar 5+ , Mg 5+);	(Co 1+ , Pm 4+);
(F 4+ , Ti 8+);	(K 0+ , Al 3+);	(Co 2+ , C 4+);
(Ne 1+ , Ge 5+);	(K 0+ , Cr 3+);	(Co 3+ , Mg 4+);
(Ne 4+ , Al 6+);	(K 0+ , Pb 3+);	(Ni 1+ , La 4+);
(Na 0+ , Cr 4+);	(K 1+ , Sc 4+);	(Ni 1+ , Yb 4+);
(Na 0+ , Ge 4+);	(K 2+ , Cl 5+);	(Ni 1+ , Lu 4+);
(Na 1+ , Sc 5+);	(Ca 0+ , Eu 3+);	(Ni 2+ , K 4+);
(Na 1+ , Bi 6+);	(Ca 0+ , Dy 3+);	(Ni 5+ , Fe 8+);
(Na 3+ , Ne 6+);	(Ca 0+ , Ho 3+);	(Cu 0+ , Ce 3+);
(Na 4+ , Ne 7+);	(Ca 0+ , Er 3+);	(Cu 0+ , Pr 3+);
(Mg 0+ , Kr 3+);	(Ca 1+ , Mg 3+);	(Cu 1+ , Ar 3+);
(Mg 2+ , Al 5+);	(Ca 1+ , Fe 4+);	(Cu 1+ , Ti 4+);
(Mg 3+ , Na 6+);	(Ca 1+ , Co 4+);	(Cu 1+ , Te 4+);
(Al 1+ , Zr 5+);	(Ca 3+ , Co 6+);	(Cu 2+ , Sn 5+);
(Al 3+ , Mg 6+);	(Ca 3+ , Y 6+);	(Zn 0+ , Y 3+);
(Al 3+ , Cr 8+);	(Sc 1+ , C 3+);	(Zn 0+ , Pm 3+);
(Si 1+ , Zn 3+);	(Sc 1+ , Te 4+);	(Zn 0+ , Gd 3+);
(Si 1+ , Ce 4+);	(Ti 1+ , Mn 3+);	(Zn 0+ , Tb 3+);
(Si 2+ , Na 4+);	(Ti 1+ , Ga 3+);	(Zn 1+ , Mo 4+);

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(Si 2+ , Cl 6+);
(Si 3+ , Be 4+);
(Si 5+ , N 6+);
(Zn 3+ , N 5+);
(Zn 5+ , Co 8+);
(Ga 1+ , Bi 4+);
(Ge 1+ , S 3+);
(Ge 1+ , Ce 4+);
(As 1+ , Ca 3+);
(As 1+ , Br 3+);
(As 2+ , F 3+);
(As 2+ , Kr 4+);
(As 2+ , Nb 5+);
(Se 1+ , Zn 3+);
(Se 1+ , Ce 4+);
(Se 2+ , Kr 4+);
(Se 2+ , Nb 5+);
(Se 3+ , Ni 5+);
(Se 4+ , Nb 7+);
(Br 0+ , Eu 3+);
(Br 0+ , Tm 3+);
(Br 1+ , Nb 4+);
(Br 1+ , Gd 4+);
(Br 1+ , Ho 4+);
(Br 1+ , Er 4+);
(Br 2+ , F 3+);
(Br 2+ , Ga 4+);
(Br 3+ , O 4+);
(Br 3+ , Al 4+);
(Br 4+ , N 5+);
(Kr 0+ , Ti 3+);
(Kr 1+ , Sn 4+);
(Kr 1+ , Sb 4+);
(Kr 2+ , Ne 3+);
(Kr 2+ , Bi 5+);
(Kr 3+ , O 4+);
(Kr 3+ , Al 4+);
(Kr 4+ , Ar 6+);
(Rb 0+ , Sc 3+);
(Rb 0+ , Zr 3+);
(Rb 0+ , Yb 3+);
(Rb 1+ , N 3+);
(Sr 1+ , C 3+);
(Sr 1+ , Ar 3+);
(Sr 1+ , Ti 4+);
(Sr 1+ , Te 4+);
(Sr 3+ , Nb 6+);
(Ti 1+ , As 3+);
(Ti 1+ , Rh 3+);
(Ti 1+ , Tl 3+);
(Y 5+ , Co 7+);
(Zr 1+ , Zr 3+);
(Zr 2+ , Sc 4+);
(Zr 2+ , Sr 4+);
(Nb 1+ , Mo 3+);
(Nb 1+ , Sb 3+);
(Nb 1+ , Bi 3+);
(Nb 2+ , Sn 4+);
(Nb 2+ , Sb 4+);
(Nb 3+ , Co 5+);
(Nb 3+ , Rb 5+);
(Nb 4+ , Zn 6+);
(Mo 1+ , Se 3+);
(Mo 1+ , I 3+);
(Mo 4+ , Fe 6+);
(Mo 5+ , Rb 8+);
(Ag 0+ , La 3+);
(Ag 0+ , Ce 3+);
(Cd 0+ , La 3+);
(In 1+ , Nd 4+);
(In 1+ , Tb 4+);
(Sn 1+ , Si 3+);
(Sn 1+ , Co 3+);
(Sn 1+ , Ge 3+);
(Sn 2+ , F 3+);
(Sn 2+ , Ga 4+);
(Sb 1+ , Si 3+);
(Sb 1+ , Co 3+);
(Sb 1+ , Ge 3+);
(Sb 2+ , As 4+);
(Te 1+ , Mn 3+);
(Te 1+ , As 3+);
(Te 1+ , Rh 3+);
(Te 1+ , Te 3+);
(Te 1+ , Tl 3+);
(Te 2+ , Cr 4+);
(Te 2+ , Ge 4+);
(Te 2+ , As 4+);
(Te 3+ , Zr 5+);
(Te 4+ , Ni 6+);
(Te 4+ , Cu 6+);
(Xe 0+ , Pr 3+);
(Xe 0+ , Nd 3+);
(La 1+ , Tc 3+);
(Zn 1+ , Pb 4+);
(Zn 2+ , N 4+);
(Zn 2+ , Kr 5+);
(Ce 1+ , Ho 3+);
(Ce 1+ , Er 3+);
(Ce 1+ , Lu 3+);
(Pr 1+ , Sc 3+);
(Pr 1+ , Zr 3+);
(Pr 1+ , Yb 3+);
(Nd 1+ , Nb 3+);
(Nd 1+ , Hf 3+);
(Pm 1+ , Nb 3+);
(Sm 1+ , Ti 3+);
(Eu 1+ , V 3+);
(Eu 1+ , Mo 3+);
(Eu 1+ , Sb 3+);
(Gd 1+ , Bi 3+);
(Tb 1+ , Hf 3+);
(Dy 1+ , Ti 3+);
(Ho 1+ , Bi 3+);
(Er 1+ , Bi 3+);
(Tm 1+ , V 3+);
(Tm 1+ , Mo 3+);
(Tm 1+ , Sb 3+);
(Yb 1+ , Al 3+);
(Yb 1+ , Ru 3+);
(Yb 1+ , In 3+);
(Yb 1+ , Sn 3+);
(Lu 1+ , Tc 3+);
(Lu 1+ , Ru 3+);
(Lu 1+ , In 3+);
(Lu 1+ , Sn 3+);
(Hf 1+ , Sc 3+);
(Hf 1+ , Yb 3+);
(Hg 0+ , La 3+);
(Pb 1+ , Ni 3+);
(Pb 1+ , Se 3+);
(Pb 2+ , F 3+);
(Pb 2+ , Ga 4+);
(Bi 1+ , P 3+);
(Bi 1+ , Sr 3+);
(La 1+ , Ru 3+);
(La 1+ , In 3+);
(La 1+ , Sn 3+);
(Ce 1+ , Sm 3+); and
(Ce 1+ , Dy 3+).

211. A method according to claim 193, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair selected from the group consisting of:

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(Ne 1+, H 1+),	(Kr 3+, B 2+),	(Tm 3+, N 1+),
(Ar 2+, H 1+),	(Rb 3+, B 2+),	(Pb 3+, N 1+),
(Sn 3+, H 1+),	(B 2+, P 1+),	(Sr 3+, N 2+),
(Pm 3+, H 1+),	(P 4+, B 3+),	(N 2+, P 2+),
(Sm 3+, H 1+),	(B 2+, S 1+),	(Ar 4+, N 3+),
(Dy 3+, H 1+),	(V 4+, B 3+),	(Fe 4+, N 3+),
(Kr 3+, He 1+),	(B 2+, As 1+),	(Ni 4+, N 3+),
(Rb 3+, He 1+),	(B 2+, Se 1+),	(N 2+, Cu 2+),
(K 4+, He 2+),	(B 2+, I 1+),	(N 2+, Pd 2+),
(Zn 4+, He 2+),	(B 2+, Ba 2+),	(N 2+, I 2+),
(Se 5+, He 2+),	(B 2+, Ce 2+),	(N 2+, La 3+),
(He 1+, Rb 2+),	(B 2+, Pr 2+),	(N 2+, Ce 3+),
(Zr 4+, He 2+),	(B 2+, Nd 2+),	(N 2+, Tl 2+),
(He 1+, Mo 3+),	(B 2+, Pm 2+),	(N 3+, Cr 4+),
(Si 2+, Li 1+),	(B 2+, Hg 1+),	(N 3+, As 4+),
(Mn 2+, Li 1+),	(B 2+, Rn 1+),	(N 3+, La 4+),
(Co 2+, Li 1+),	(B 2+, Ra 2+),	(Ne 4+, N 5+),
(Pd 2+, Li 1+),	(Cl 2+, C 1+),	(Fe 6+, N 5+),
(I 2+, Li 1+),	(Zn 2+, C 1+),	(Kr 7+, N 5+),
(Hf 3+, Li 1+),	(Nb 3+, C 1+),	(Nb 6+, N 5+),
(Li 1+, C 3+),	(Pr 3+, C 1+),	(N 4+, Te 6+),
(Li 1+, N 3+),	(Kr 3+, C 2+),	(Ne 1+, O 1+),
(Li 1+, Na 2+),	(Rb 3+, C 2+),	(Ar 2+, O 1+),
(Li 1+, S 4+),	(C 2+, P 2+),	(Sn 3+, O 1+),
(Cu 5+, Li 2+),	(Ar 4+, C 3+),	(Pm 3+, O 1+),
(Li 1+, Br 4+),	(Fe 4+, C 3+),	(Sm 3+, O 1+),
(Br 6+, Li 2+),	(Ni 4+, C 3+),	(Dy 3+, O 1+),
(V 6+, Li 3+),	(C 2+, Cu 2+),	(F 2+, O 2+),
(Li 2+, Mn 6+),	(C 2+, Ga 2+),	(Ne 2+, O 2+),
(Cu 2+, Be 1+),	(C 2+, Y 3+),	(O 1+, Mg 1+),
(Kr 2+, Be 1+),	(C 2+, Pd 2+),	(O 1+, Ti 1+),
(Cd 2+, Be 1+),	(C 2+, Ce 3+),	(O 1+, V 1+),
(Te 3+, Be 1+),	(C 2+, Gd 3+),	(O 1+, Cr 1+),
(Ce 3+, Be 1+),	(C 2+, Au 2+),	(O 1+, Mn 1+),
(K 2+, Be 2+),	(C 2+, Tl 2+),	(O 1+, Fe 1+),
(V 3+, Be 2+),	(Sc 4+, C 4+),	(O 1+, Co 1+),
(Ge 3+, Be 2+),	(C 3+, Cu 3+),	(O 1+, Ni 1+),
(Mo 3+, Be 2+),	(C 3+, Br 3+),	(O 1+, Cu 1+),
(Bi 3+, Be 2+),	(C 3+, Kr 3+),	(O 1+, Ge 1+),
(Be 2+, Ne 5+),	(C 3+, Cd 3+),	(O 1+, Zr 1+),
(Be 2+, Kr 8+),	(C 3+, Te 4+),	(O 1+, Nb 1+),
(Be 2+, Mo 7+),	(C 3+, Ce 4+),	(O 1+, Mo 1+),
(Be 3+, Al 6+),	(Se 3+, N 1+),	(O 1+, Tc 1+),
(Br 2+, B 1+),	(Eu 3+, N 1+),	(O 1+, Ru 1+),

(Ce 3 + , B 1 +), (Ho 3 + , N 1 +), (O 1 + , Rh 1 +),
(Cl 3 + , B 2 +), (Er 3 + , N 1 +), (O 1 + , Ag 1 +),
(O 1 + , Sn 1 +), (Ar 5 + , F 3 +), (Hf 3 + , Na 1 +),
(O 1 + , Ta 1 +), (Cr 5 + , F 3 +), (Na 1 + , Al 2 +),
(O 1 + , W 1 +), (F 2 + , Ni 3 +), (Na 1 + , P 2 +),
(O 1 + , Re 1 +), (F 2 + , Ge 3 +), (Ar 4 + , Na 2 +),
(O 1 + , Pb 1 +), (Sr 5 + , F 3 +), (Fe 4 + , Na 2 +),
(O 1 + , Bi 1 +), (F 2 + , Zr 4 +), (Ni 4 + , Na 2 +),
(O 2 + , Ar 2 +), (F 2 + , Ag 3 +), (Na 1 + , Pd 2 +),
(K 4 + , O 3 +), (F 4 + , F 4 +), (Na 1 + , In 2 +),
(O 2 + , Ti 3 +), (Cl 6 + , F 4 +), (Na 1 + , I 2 +),
(Zn 4 + , O 3 +), (F 3 + , Ar 4 +), (Na 1 + , La 3 +),
(O 2 + , Rb 2 +), (F 3 + , Zn 4 +), (Na 1 + , Ce 3 +),
(O 2 + , Mo 3 +), (F 3 + , Br 5 +), (Na 3 + , Na 3 +),
(O 3 + , Cr 4 +), (F 3 + , Te 5 +), (K 5 + , Na 3 +),
(O 3 + , As 4 +), (F 4 + , F 4 +), (Na 2 + , Ti 4 +),
(O 3 + , La 4 +), (Mg 4 + , F 5 +), (Ti 4 + , Na 3 +),
(Mg 4 + , O 5 +), (F 6 + , F 6 +), (Fe 5 + , Na 3 +),
(O 5 + , Sc 6 +), (Cr 7 + , F 6 +), (Rb 6 + , Na 3 +),
(Cu 7 + , O 6 +), (F 5 + , Co 7 +), (Na 2 + , Sr 3 +),
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(O 5 + , Kr 7 +), (F 5 + , Y 8 +), (Na 2 + , Sb 4 +),
(Si 3 + , F 1 +), (F 6 + , F 6 +), (Na 2 + , Gd 4 +),
(K 2 + , F 1 +), (F 6 + , Ne 6 +), (Na 2 + , Yb 4 +),
(Ge 3 + , F 1 +), (F 6 + , Co 8 +), (Na 3 + , Na 3 +),
(Lu 3 + , F 1 +), (Cr 3 + , Ne 1 +), (Kr 7 + , Na 4 +),
(Bi 3 + , F 1 +), (La 3 + , Ne 1 +), (Na 3 + , Rb 5 +),
(F 2 + , F 2 +), (Ne 1 + , Cl 1 +), (Na 3 + , Sr 5 +),
(Ne 2 + , F 2 +), (Ne 1 + , Sc 2 +), (Mo 6 + , Na 4 +),
(F 1 + , Mg 1 +), (Ne 1 + , Ti 2 +), (Na 3 + , Te 6 +),
(F 1 + , Sc 1 +), (Cr 4 + , Ne 2 +), (Si 4 + , Na 5 +),
(F 1 + , Ti 1 +), (Se 4 + , Ne 2 +), (Na 4 + , Sc 6 +),
(F 1 + , V 1 +), (Ne 1 + , Zr 2 +), (Cu 7 + , Na 5 +),
(F 1 + , Cr 1 +), (Mo 5 + , Ne 2 +), (Na 4 + , Kr 7 +),
(F 1 + , Mn 1 +), (Ne 1 + , Lu 2 +), (S 2 + , Mg 1 +),
(F 1 + , Fe 1 +), (Pb 4 + , Ne 2 +), (Ni 2 + , Mg 1 +),
(F 1 + , Co 1 +), (Ar 5 + , Ne 3 +), (Br 2 + , Mg 1 +),
(F 1 + , Ni 1 +), (Sc 4 + , Ne 3 +), (Ag 2 + , Mg 1 +),
(F 1 + , Cu 1 +), (Cr 5 + , Ne 3 +), (Ti 3 + , Mg 2 +),
(F 1 + , Ge 1 +), (Ne 2 + , Ni 3 +), (Se 3 + , Mg 2 +),
(F 1 + , Zr 1 +), (Ne 2 + , Br 3 +), (Eu 3 + , Mg 2 +),
(F 1 + , Nb 1 +), (Sr 5 + , Ne 3 +), (Ho 3 + , Mg 2 +),
(F 1 + , Mo 1 +), (Ar 6 + , Ne 4 +), (Er 3 + , Mg 2 +),
(F 1 + , Tc 1 +), (Ne 3 + , Cr 5 +), (Tm 3 + , Mg 2 +),
(F 1 + , Ru 1 +), (Fe 6 + , Ne 4 +), (Pb 3 + , Mg 2 +),
(F 1 + , Rh 1 +), (Nb 6 + , Ne 4 +), (Ni 5 + , Mg 3 +),
(F 1 + , Ag 1 +), (Ne 3 + , Pb 5 +), (Zn 5 + , Mg 3 +),
(F 1 + , Sn 1), (Ne 4 + , Na 4 +), (Mg 2 + , Kr 4 +),
(F 1 + , Hf 1 +), (Al 4 + , Ne 5 +), (Mg 2 + , Rb 4 +),
(F 1 + , Ta 1 +), (Ne 4 + , Fe 6 +), (Sb 5 + , Mg 3 +),
(F 1 + , Re 1 +), (Ne 4 + , Rb 7 +), (Mg 3 + , Se 6 +),

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(F 1 + , Pb 1 +),	(Si 2 + , Na 1 +),	(Mg 3 + , Zr 5 +),
(F 1 + , Bi 1 +),	(Co 2 + , Na 1 +),	(Te 6 + , Mg 4 +),
(F 2 + , F 2 +),	(Pd 2 + , Na 1 +),	(Mg 4 + , Cl 7 +),
(F 2 + , S 3 +),	(I 2 + , Na 1 +),	(Ti 7 + , Mg 5 +),
(Mg 5 + , Sc 8 +),	(Si 2 + , Ac 1 +),	(S 2 + , Ti 1 +),
(Mg 6 + , Mn 8 +),	(Si 2 + , Th 1 +),	(S 2 + , V 1 +),
(Si 2 + , Al 1 +),	(Si 2 + , Pa 1 +),	(S 2 + , Cr 1 +),
(Mn 2 + , Al 1 +),	(Si 2 + , U 1 +),	(S 2 + , Mn 1 +),
(Co 2 + , Al 1 +),	(Si 2 + , Np 1 +),	(S 2 + , Ni 1 +),
(Ge 2 + , Al 1 +),	(Si 2 + , Pu 1 +),	(S 2 + , Cu 1 +),
(Zr 3 + , Al 1 +),	(Si 2 + , Am 1 +),	(S 2 + , Y 1 +),
(I 2 + , Al 1 +),	(Si 2 + , Cm 1 +),	(S 2 + , Zr 1 +),
(Hf 3 + , Al 1 +),	(Si 2 + , Bk 1 +),	(S 2 + , Nb 1 +),
(Hg 2 + , Al 1 +),	(Si 2 + , Cf 1 +),	(S 2 + , Mo 1 +),
(S 3 + , Al 2 +),	(Si 2 + , Es 1 +),	(S 2 + , Tc 1 +),
(V 3 + , Al 2 +),	(S 4 + , Si 4 +),	(S 2 + , Ru 1 +),
(Br 3 + , Al 2 +),	(Sc 3 + , Si 4 +),	(S 2 + , Rh 1 +),
(Mo 3 + , Al 2 +),	(Mn 4 + , Si 4 +),	(S 2 + , Ag 1 +),
(Sb 4 + , Al 3 +),	(Si 3 + , Co 2 +),	(S 2 + , Sn 1 +),
(Bi 4 + , Al 3 +),	(Si 3 + , Zn 2 +),	(S 2 + , Hf 1 +),
(Ca 7 + , Al 4 +),	(Si 3 + , Ru 2 +),	(S 2 + , Pb 1 +),
(Al 3 + , Sc 5 +),	(Si 3 + , Rh 2 +),	(S 2 + , Bi 1 +),
(Al 4 + , Kr 8 +),	(Si 3 + , Cd 2 +),	(S 2 + , Es 1 +),
(Al 5 + , Ni 8 +),	(Sn 4 + , Si 4 +),	(Ar 4 + , S 4 +),
(Ni 2 + , Si 1 +),	(Si 3 + , Bi 2 +),	(Fe 4 + , S 4 +),
(Br 2 + , Si 1 +),	(Si 4 + , Cu 7 +),	(Ni 4 + , S 4 +),
(Sr 2 + , Si 2 +),	(Nb 3 + , P 1 +),	(S 3 + , Cu 2 +),
(Sb 3 + , Si 2 +),	(Pr 3 + , P 1 +),	(S 3 + , Pd 2 +),
(Gd 3 + , Si 2 +),	(S 3 + , P 2 +),	(S 3 + , In 2 +),
(Yb 3 + , Si 2 +),	(Br 3 + , P 2 +),	(S 3 + , I 2 +),
(K 3 + , Si 3 +),	(P 3 + , S 2 +),	(S 3 + , La 3 +),
(Si 2 + , Ca 1 +),	(P 3 + , Cl 2 +),	(S 3 + , Ce 3 +),
(Si 2 + , Ga 1 +),	(Co 4 + , P 4 +),	(K 5 + , S 5 +),
(Si 2 + , Sr 1 +),	(P 3 + , Kr 2 +),	(S 4 + , Sb 4 +),
(Si 2 + , Y 1 +),	(Kr 5 + , P 4 +),	(S 4 + , Lu 4 +),
(Y 3 + , Si 3 +),	(P 3 + , Zr 3 +),	(S 4 + , Bi 4 +),
(Mo 4 + , Si 3 +),	(P 3 + , Sm 3 +),	(S 5 + , Ar 4 +),
(Si 2 + , In 1 +),	(P 3 + , Tm 3 +),	(S 5 + , K 4 +),
(Si 2 + , Ba 1 +),	(P 3 + , Hf 3 +),	(S 5 + , Br 5 +),
(Si 2 + , La 1 +),	(P 4 + , Cu 3 +),	(Y 6 + , S 6 +),
(Si 2 + , Ce 1 +),	(Ge 4 + , P 5 +),	(Ar 2 + , Cl 1 +),
(Si 2 + , Pr 1 +),	(P 4 + , Kr 3 +),	(Rb 2 + , Cl 1 +),
(Si 2 + , Nd 1 +),	(Y 5 + , P 5 +),	(Sn 3 + , Cl 1 +),
(Si 2 + , Pm 1 +),	(P 4 + , Cd 3 +),	(Nd 3 + , Cl 1 +),
(Si 2 + , Sm 1 +),	(P 4 + , Te 4 +),	(Pm 3 + , Cl 1 +),
(Si 2 + , Eu 1 +),	(P 4 + , Ce 4 +),	(Sm 3 + , Cl 1 +),
(Si 2 + , Gd 1 +),	(P 5 + , Br 8 +),	(Ca 2 + , Cl 2 +),
(Si 2 + , Tb 1 +),	(P 7 + , S 7 +),	(Mn 3 + , Cl 2 +),
(Si 2 + , Dy 1 +),	(Nb 3 + , S 1 +),	(Co 3 + , Cl 2 +),
(Si 2 + , Ho 1 +),	(Cd 2 + , S 1 +),	(Cl 4 + , Cl 3 +),

(Si 2 + , Er 1 +),	(Te 3 + , S 1 +),	(Cl 2 + , Ca 2 +),
(Si 2 + , Tm 1 +),	(Ca 2 + , S 2 +),	(Ca 3 + , Cl 3 +),
(Si 2 + , Yb 1 +),	(Mn 3 + , S 2 +),	(Cl 2 + , Br 1 +),
(Si 2 + , Lu 1 +),	(Co 3 + , S 2 +),	(Cl 2 + , Y 2 +),
(Si 2 + , Tl 1 +),	(Nb 4 + , S 2 +),	(Mo 5 + , Cl 3 +),
(Si 2 + , Ra 1 +),	(S 2 + , Sc 1 +),	(Cl 2 + , Xe 1 +),
(Cl 2 + , Eu 2 +),	(Br 6 + , Ar 5 +),	(Pr 3 + , Ca 2 +),
(Cl 2 + , Gd 2 +),	(Nb 5 + , Ar 5 +),	(Tb 3 + , Ca 2 +),
(Cl 2 + , Tb 2 +),	(Ti 5 + , Ar 6 +),	(Kr 5 + , Ca 3 +),
(Cl 2 + , Dy 2 +),	(Mn 6 + , Ar 6 +),	(Ca 2 + , Zr 3 +),
(Cl 2 + , Ho 2 +),	(Ar 5 + , Ga 4 +),	(Ca 2 + , Sm 3 +),
(Cl 2 + , Er 2 +),	(Ar 5 + , As 5 +),	(Ca 2 + , Dy 3 +),
(Cl 2 + , Tm 2 +),	(Ar 7 + , Y 7 +),	(Ca 2 + , Ho 3 +),
(Cl 2 + , Yb 2 +),	(K 1 + , K 1 +),	(Ca 2 + , Er 3 +),
(Se 5 + , Cl 4 +),	(Xe 2 + , K 1 +),	(Ca 2 + , Tm 3 +),
(Zr 4 + , Cl 4 +),	(Pb 2 + , K 1 +),	(Ca 2 + , Hf 3 +),
(Cl 3 + , Nb 3 +),	(K 1 + , K 1 +),	(Mn 5 + , Ca 4 +),
(Cl 3 + , Sb 3 +),	(Zn 3 + , K 2 +),	(Ca 3 + , Zn 3 +),
(Cl 3 + , Cs 2 +),	(Br 4 + , K 2 +),	(Ca 3 + , Rb 3 +),
(Cl 3 + , Yb 3 +),	(K 1 + , Rb 1 +),	(Ca 3 + , Pr 4 +),
(Cl 3 + , Bi 3 +),	(Te 4 + , K 2 +),	(Ca 3 + , Tb 4 +),
(Cl 4 + , Cl 3 +),	(K 1 + , Cs 1 +),	(Ca 4 + , Sr 4 +),
(Cl 4 + , Ar 3 +),	(Sc 3 + , K 3 +),	(Ca 4 + , Sb 5 +),
(Mn 5 + , Cl 5 +),	(K 2 + , Ni 2 +),	(Ca 4 + , Bi 5 +),
(Cl 4 + , Zn 3 +),	(K 2 + , Zn 2 +),	(Ca 5 + , Se 6 +),
(Cl 4 + , Rb 3 +),	(K 2 + , As 2 +),	(Rb 7 + , Ca 6 +),
(Cl 4 + , Sn 4 +),	(K 2 + , Rh 2 +),	(Ca 5 + , Zr 5 +),
(Cl 4 + , Nd 4 +),	(K 2 + , Te 2 +),	(Te 6 + , Ca 6 +),
(Cl 4 + , Tb 4 +),	(K 2 + , Pt 2 +),	(Ca 6 + , Ti 5 +),
(Ar 6 + , Cl 6 +),	(K 3 + , Mn 3 +),	(Se 6 + , Ca 7 +),
(Cl 5 + , Cr 5 +),	(K 3 + , Co 3 +),	(Ca 7 + , Ti 6 +),
(Fe 6 + , Cl 6 +),	(Br 5 + , K 4 +),	(Ca 7 + , Mn 7 +),
(Nb 6 + , Cl 6 +),	(K 3 + , Pd 3 +),	(Mn 2 + , Sc 1 +),
(Cl 5 + , Pb 5 +),	(K 3 + , I 3 +),	(Ge 2 + , Sc 1 +),
(Ti 3 + , Ar 1 +),	(K 3 + , Hf 4 +),	(Zr 3 + , Sc 1 +),
(Se 3 + , Ar 1 +),	(Bi 5 + , K 4 +),	(Ag 2 + , Sc 1 +),
(Sr 2 + , Ar 1 +),	(Sc 5 + , K 5 +),	(Hg 2 + , Sc 1 +),
(Sb 3 + , Ar 1 +),	(K 4 + , Fe 4 +),	(Rb 2 + , Sc 2 +),
(Gd 3 + , Ar 1 +),	(K 4 + , Ni 4 +),	(Sn 3 + , Sc 2 +),
(Yb 3 + , Ar 1 +),	(K 4 + , Cu 4 +),	(Nd 3 + , Sc 2 +),
(Fe 3 + , Ar 2 +),	(Kr 6 + , K 5 +),	(Pm 3 + , Sc 2 +),
(Ni 3 + , Ar 2 +),	(Ca 6 + , K 6 +),	(Kr 3 + , Sc 3 +),
(Cu 3 + , Ar 2 +),	(V 5 + , K 6 +),	(Rb 3 + , Sc 3 +),
(Sb 4 + , Ar 2 +),	(K 5 + , Mn 5 +),	(Sc 3 + , Ge 4 +),
(Bi 4 + , Ar 2 +),	(As 5 + , K 6 +),	(Sc 3 + , Mo 4 +),
(Ar 2 + , Sc 2 +),	(K 5 + , Sr 5 +),	(Sc 3 + , Lu 4 +),
(Ar 2 + , Ti 2 +),	(K 5 + , Sn 5 +),	(Sc 3 + , Bi 4 +),
(Se 4 + , Ar 3 +),	(K 7 + , Ca 7 +),	(Ti 5 + , Sc 5 +),
(Ar 2 + , Zr 2 +),	(K 7 + , As 6 +),	(Mn 6 + , Sc 5 +),
(Mo 5 + , Ar 3 +),	(K 7 + , Mo 7 +),	(Sc 4 + , Ga 4 +),

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(Pb 4 +, Ar 3 +),	(Mn 2 +, Ca 1 +),	(Sc 4 +, As 5 +),
(Ar 3 +, K 2 +),	(Co 2, Ca 1 +),	(Cu 6 +, Sc 6 +),
(Ar 3 +, Xe 3 +),	(Ge 2 +, Ca 1 +),	(Cu 7 +, Sc 7 +),
(Ar 3 +, Pb 3 +),	(Zr 3 +, Ca 1 +),	(Ni 2 +, Ti 1 +),
(Bi 5 +, Ar 4 +),	(Hf 3 +, Ca 1 +),	(Ge 2 +, Ti 1 +),
(Ar 4 +, V 4 +),	(Hg 2 +, Ca 1 +),	(Zr 3 +, Ti 1 +),
(Cu 5 +, Ar 5 +),	(Zn 2 +, Ca 2 +),	(Ag 2 +, Ti 1 +),
(Ar 4 +, Br 4 +),	(Rb 2 +, Ca 2 +),	(Hg 2 +, Ti 1 +),
(Sn 3 +, Ti 2 +),	(Se 6 +, V 6 +),	(Mn 2 +, Dy 1 +),
(Pm 3 +, Ti 2 +),	(V 6 +, Sr 8 +),	(Mn 2 +, Ho 1 +),
(Sm 3 +, Ti 2 +),	(Ni 2 +, Cr 1 +),	(Mn 2 +, Er 1 +),
(Dy 3 +, Ti 2 +),	(Ge 2 +, Cr 1 +),	(Mn 2 +, Tm 1 +),
(Fe 3 +, Ti 3 +),	(Zr 3 +, Cr 1 +),	(Mn 2 +, Yb 1 +),
(Ni 3 +, Ti 3 +),	(Ag 2 +, Cr 1 +),	(Mn 2 +, Lu 1 +),
(Cu 3 +, Ti 3 +),	(Hg 2 +, Cr 1 +),	(Mn 2 +, Hf 1 +),
(Ti 3 +, Mn 2 +),	(Sr 2 +, Cr 2 +),	(Mn 2 +, Tl 1 +),
(Ti 3 +, Fe 2 +),	(Sb 3 +, Cr 2 +),	(Mn 2 +, Ra 1 +),
(Ti 3 +, Ge 2 +),	(Gd 3 +, Cr 2 +),	(Mn 2 +, Ac 1 +),
(Rb 4 +, Ti 4 +),	(Yb 3 +, Cr 2 +),	(Mn 2 +, Th 1 +),
(Sr 4 +, Ti 4 +),	(Zn 3 +, Cr 3 +),	(Mn 2 +, Pa 1 +),
(Ti 3 +, Mo 2 +),	(Te 4 +, Cr 3 +),	(Mn 2 +, U 1 +),
(Ti 3 +, Tc 2 +),	(Cr 2 +, Cs 1 +),	(Mn 2 +, Np 1 +),
(Te 5 +, Ti 4 +),	(Cr 3 +, Se 2 +),	(Mn 2 +, Pu 1 +),
(Ti 3 +, Hf 2 +),	(Cr 3 +, Br 2 +),	(Mn 2 +, Am 1 +),
(Ti 3 +, Pb 2 +),	(Y 4 +, Cr 4 +),	(Mn 2 +, Cm 1 +),
(As 5 +, Ti 5 +),	(Cr 3 +, Ag 2 +),	(Mn 2 +, Bk 1 +),
(Ti 4 +, Rb 5 +),	(Cr 3 +, Xe 2 +),	(Mn 2 +, Cf 1 +),
(Ti 4 +, Sr 5 +),	(Cr 3 +, Pr 3 +),	(Mn 2 +, Es 1 +),
(Mo 6 +, Ti 5 +),	(Cr 3 +, Gd 3 +),	(Co 4 +, Mn 4 +),
(Ti 7 +, Ti 7 +),	(Cr 3 +, Tb 3 +),	(Kr 5 +, Mn 4 +),
(Ti 7 +, Ti 7 +),	(Cr 3 +, Lu 3 +),	(Mn 3 +, Zr 3 +),
(Mn 7 +, Ti 8 +),	(Cr 4 +, Pm 4 +),	(Mn 3 +, Sm 3 +),
(Ni 2 +, V 1 +),	(Cr 4 +, Sm 4 +),	(Mn 3 +, Dy 3 +),
(Ge 2 +, V 1 +),	(Cr 4 +, Dy 4 +),	(Mn 3 +, Ho 3 +),
(Zr 3 +, V 1 +),	(Cr 6 +, Ni 7 +),	(Mn 3 +, Er 3 +),
(Ag 2 +, V 1 +),	(Cr 6 +, Zn 7 +),	(Mn 3 +, Tm 3 +),
(Hg 2 +, V 1 +),	(Cr 7 +, Co 8 +),	(Mn 3 +, Hf 3 +),
(Se 3 +, V 2 +),	(Ni 2 +, Mn 1 +),	(Mn 4 +, Sb 4 +),
(Eu 3 +, V 2 +),	(Ag 2 +, Mn 1 +),	(Mn 4 +, Gd 4 +),
(Ho 3 +, V 2 +),	(Se 3 +, Mn 2 +),	(Mn 4 +, Lu 4 +),
(Er 3 +, V 2 +),	(Sr 2 +, Mn 2 +),	(Mn 4 +, Bi 4 +),
(Tm 3 +, V 2 +),	(Gd 3 +, Mn 2 +),	(Sr 7 +, Mn 6 +),
(Pb 3 +, V 2 +),	(Tm 3 +, Mn 2 +),	(Mn 6 +, Sr 6 +),
(Sr 3 +, V 3 +),	(Yb 3 +, Mn 2 +),	(Ni 2 +, Fe 1 +),
(Fe 4 +, V 4 +),	(Mn 2 +, Ga 1 +),	(Br 2 +, Fe 1 +),
(V 3 +, As 2 +),	(Mn 2 +, Sr 1 +),	(Sr 2 +, Fe 2 +),
(V 3 +, Pd 2 +),	(Mn 2 +, Y 1 +),	(Sb 3 +, Fe 2 +),
(V 3 +, In 2 +),	(Y 3 +, Mn 3 +),	(Gd 3 +, Fe 2 +),
(V 3 +, Te 2 +),	(Mo 4 +, Mn 3 +),	(Yb 3 +, Fe 2 +),
(V 3 +, I 2 +),	(Mn 2 +, In 1 +),	(Te 4 +, Fe 3 +),

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(V 3+ , La 3+),	(Mn 2+ , Ba 1+),	(Zn 4+ , Fe 4+),
(V 3+ , Pt 2+),	(Mn 2+ , La 1+),	(Fe 3+ , Rb 2+),
(V 3+ , Hg 2+),	(Mn 2+ , Ce 1+),	(Fe 3+ , Mo 3+),
(V 4+ , Cu 3+),	(Mn 2+ , Pr 1+),	(Cu 5+ , Fe 5+),
(Ge 4+ , V 5+),	(Mn 2+ , Nd 1+),	(Fe 4+ , Br 4+),
(V 4+ , Kr 3+),	(Mn 2+ , Pm 1+),	(Br 6+ , Fe 5+),
(Y 5+ , V 5+),	(Mn 2+ , Sm 1+),	(Nb 5+ , Fe 5+),
(V 4+ , Cd 3+),	(Mn 2+ , Eu 1+),	(Fe 5+ , Rb 5+),
(V 4+ , Te 4+),	(Mn 2+ , Gd 1+),	(Fe 5+ , Sr 5+),
(V 4+ , Ce 4+),	(Mn 2+ , Tb 1+),	(Mo 6+ , Fe 6+),
(Fe 5+ , Te 6+),	(Co 7+ , Y 8+),	(Zn 4+ , Cu 4+),
(Mo 7+ , Fe 7+),	(Ni 2+ , Ni 1+),	(Cu 3+ , Rb 2+),
(Ni 2+ , Co 1+),	(Br 2+ , Ni 1+),	(Cu 3+ , Mo 3+),
(Br 2+ , Co 1+),	(Ag 2+ , Ni 1+),	(Cu 3+ , In 3+),
(Sb 3+ , Co 2+),	(Ge 3+ , Ni 2+),	(Cu 3+ , Te 3+),
(Lu 3+ , Co 2+),	(Mo 3+ , Ni 2+),	(Zn 5+ , Cu 5+),
(Bi 3+ , Co 2+),	(Lu 3+ , Ni 2+),	(Cu 4+ , Kr 4+),
(Co 2+ , Ga 1+),	(Bi 3+ , Ni 2+),	(Cu 4+ , Rb 4+),
(Co 2+ , Sr 1+),	(Ni 2+ , Ni 1+),	(Sb 5+ , Cu 5+),
(Co 2+ , Y 1+),	(Ni 2+ , Cu 1+),	(Cu 6+ , Kr 7+),
(Y 3+ , Co 3+),	(Ni 2+ , Ge 1+),	(Kr 2+ , Zn 1+),
(Mo 4+ , Co 3+),	(As 4+ , Ni 3+),	(Cd 2+ , Zn 1+),
(Co 2+ , In 1+),	(Ni 2+ , Zr 1+),	(Te 3+ , Zn 1+),
(Co 2+ , Ba 1+),	(Ni 2+ , Nb 1+),	(Ce 3+ , Zn 1+),
(Co 2+ , La 1+),	(Ni 2+ , Mo 1+),	(Ge 3+ , Zn 2+),
(Co 2+ , Ce 1+),	(Ni 2+ , Tc 1+),	(Mo 3+ , Zn 2+),
(Co 2+ , Pr 1+),	(Ni 2+ , Ru 1+),	(Lu 3+ , Zn 2+),
(Co 2+ , Nd 1+),	(Ni 2+ , Rh 1+),	(Bi 3+ , Zn 2+),
(Co 2+ , Pm 1+),	(Ni 2+ , Ag 1+),	(Zn 2+ , Br 1+),
(Co 2+ , Sm 1+),	(Ni 2+ , Sn 1+),	(Zn 2+ , Y 2+),
(Co 2+ , Eu 1+),	(Ni 2+ , Ta 1+),	(Mo 5+ , Zn 3+),
(Co 2+ , Gd 1+),	(Ni 2+ , W 1+),	(Zn 2+ , Xe 1+),
(Co 2+ , Tb 1+),	(Ni 2+ , Re 1+),	(Zn 2+ , Eu 2+),
(Co 2+ , Dy 1+),	(Ni 2+ , Pb 1+),	(Zn 2+ , Gd 2+),
(Co 2+ , Ho 1+),	(Ni 2+ , Bi 1+),	(Zn 2+ , Tb 2+),
(Co 2+ , Er 1+),	(Zn 4+ , Ni 4+),	(Zn 2+ , Dy 2+),
(Co 2+ , Tm 1+),	(Ni 3+ , Rb 2+),	(Zn 2+ , Ho 2+),
(Co 2+ , Yb 1+),	(Ni 3 , Mo 3+),	(Zn 2+ , Er 2+),
(Co 2+ , Lu 1+),	(Cu 5+ , Ni 5+),	(Zn 2+ , Tm 2+),
(Co 2+ , Tl 1+),	(Ni 4+ , Br 4+),	(Zn 2+ , Yb 2+),
(Co 2+ , Ra 1+),	(Br 6+ , Ni 5+),	(Zn 3+ , Rh 3+),
(Co 2+ , Ac 1+),	(Nb 5+ , Ni 5+),	(Zn 3+ , Xe 3+),
(Co 2+ , Th 1+),	(Ni 5+ , Cu 5+),	(Zn 3+ , Pb 3+),
(Co 2+ , Pa 1+),	(Rb 7+ , Ni 6+),	(Kr 6+ , Zn 5+),
(Co 2+ , U 1+),	(Ni 7+ , Zn 7+),	(Rb 7+ , Zn 6+),
(Co 2+ , Np 1+),	(Br 2+ , Cu 1+),	(Zn 6+ , Sr 7+),
(Co 2+ , Pu 1+),	(Ag 2+ , Cu 1+),	(Ge 2+ , Ga 1+),
(Co 2+ , Am 1+),	(Br 3+ , Cu 2+),	(Zr 3+ , Ga 1+),
(Co 2+ , Cm 1+),	(Cu 2+ , Zn 1+),	(I 2+ , Ga 1+),
(Co 2+ , Bk 1+),	(Ga 3+ , Cu 3+),	(Hf 3+ , Ga 1+),

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(Co 2 + , Cf 1 +),	(Cu 2 + , As 1 +),	(Hg 2 + , Ga 1 +),
(Co 2 + , Es 1 +),	(Cu 2 + , Se 1 +),	(Te 4 + , Ga 3 +),
(Co 4 + , Co 4 +),	(Kr 4 + , Cu 3 +),	(Ga 3 + , Br 3 +),
(Kr 5 + , Co 4 +),	(Cu 2 + , Pd 1 +),	(Ga 3 + , Kr 3 +),
(Co 3 + , Zr 3 +),	(Cu 2 + , Cd 1 +),	(Ga 3 + , Ce 4 +),
(Co 3 + , Sm 3 +),	(Cu 2 + , Sb 1 +),	(Br 2 + , Ge 1 +),
(Co 3 + , Ho 3 +),	(Cu 2 + , Te 1 +),	(Se 3 + , Ge 2 +),
(Co 3 + , Tm 3 +),	(Cu 2 + , Os 1 +),	(Sr 2 + , Ge 2 +),
(Co 3 + , Hf 3 +),	(Cu 2 + , Ir 1 +),	(Sb 3 + , Ge 2 +),
(Co 4 + , Co 4 +),	(Cu 2 + , Pt 1 +),	(Gd 3 + , Ge 2 +),
(Co 7 + , Co 7 +),	(Cu 2 + , Au 1 +),	(Yb 3 + , Ge 2 +),
(Co 7 + , Co 7 +),	(Cu 2 + , Po 1 +),	(Ge 2 + , Y 1 +),
(Y 3 + , Ge 3 +),	(Te 4 + , Se 3 +),	(Kr 3 + , Eu 3 +),
(Ge 2 + , Zr 1 +),	(Rb 4 + , Se 4 +),	(Kr 3 + , Yb 3 +),
(Ge 2 + , Nb 1 +),	(Se 3 + , Tc 2 +),	(Kr 4 + , Kr 3 +),
(Ge 2 + , Mo 1 +),	(Se 3 + , Sn 2 +),	(Y 5 + , Kr 5 +),
(Ge 2 + , In 1 +),	(Te 5 + , Se 4 +),	(Kr 4 + , Cd 3 +),
(Ge 2 + , Gd 1 +),	(Se 3 + , Hf 2 +),	(Kr 4 + , Te 4 +),
(Ge 2 + , Tb 1 +),	(Se 3 + , Pb 2 +),	(Kr 4 + , Ce 4 +),
(Ge 2 + , Dy 1 +),	(Se 4 + , Rb 3 +),	(Sr 6 + , Kr 6 +),
(Ge 2 + , Ho 1 +),	(Se 4 + , Sn 4 +),	(Kr 5 + , Nb 5 +),
(Ge 2 + , Er 1 +),	(Se 4 + , Nd 4 +),	(Xe 2 + , Rb 1 +),
(Ge 2 + , Tm 1 +),	(Se 4 + , Pm 4 +),	(Pb 2 + , Rb 1 +),
(Ge 2 + , Yb 1 +),	(Se 5 + , In 4 +),	(Rb 2 + , Y 2 +),
(Ge 2 + , Hf 1 +),	(Rb 2 + , Br 1 +),	(Mo 5 + , Rb 3 +),
(Ge 2 + , Tl 1 +),	(Pr 3 + , Br 1 +),	(Rb 2 + , Xe 1 +),
(Ge 2 + , Th 1 +),	(Tb 3 + , Br 1 +),	(Rb 2 + , Gd 2 +),
(Ge 2 + , Pa 1 +),	(La 3 + , Br 2 +),	(Rb 2 + , Tb 2 +),
(Ge 2 + , U 1 +),	(Br 2 + , Pd 1 +),	(Rb 2 + , Dy 2 +),
(Ge 2 + , Np 1 +),	(Br 2 + , Ag 1 +),	(Rb 2 + , Ho 2 +),
(Ge 2 + , Pu 1 +),	(Br 2 + , Cd 1 +),	(Rb 2 + , Er 2 +),
(Ge 2 + , Am 1 +),	(Br 2 + , Sb 1 +),	(Rb 2 + , Tm 2 +),
(Ge 2 + , Cm 1 +),	(Br 2 + , Ta 1 +),	(Rb 2 + , Yb 2 +),
(Ge 2 + , Bk 1 +),	(Br 2 + , W 1 +),	(Rb 3 + , Nb 3 +),
(Ge 2 + , Cf 1 +),	(Br 2 + , Re 1 +),	(Rb 3 + , Sb 3 +),
(Ge 2 + , Es 1 +),	(Br 2 + , Os 1 +),	(Rb 3 + , Cs 2 +),
(Ge 3 + , As 2 +),	(Br 2 + , Po 1 +),	(Rb 3 + , Eu 3 +),
(Ge 3 + , Rh 2 +),	(Br 3 + , Pd 2 +),	(Rb 3 + , Yb 3 +),
(Ge 3 + , Te 2 +),	(Br 3 + , In 2 +),	(Rb 3 + , Bi 3 +),
(Ge 3 + , Pt 2 +),	(Br 3 + , I 2 +),	(Rb 6 + , Rb 5 +),
(Kr 2 + , As 1 +),	(Br 3 + , La 3 +),	(Rb 4 + , Sr 3 +),
(Nb 3 + , As 1 +),	(Br 3 + , Ce 3 +),	(Rb 4 + , Eu 4 +),
(Cd 2 + , As 1 +),	(Br 4 + , Xe 3 +),	(Rb 4 + , Er 4 +),
(Te 3 + , As 1 +),	(Br 4 + , Pb 3 +),	(Rb 4 + , Tm 4 +),
(Mo 3 + , As 2 +),	(Y 6 + , Br 6 +),	(Rb 4 + , Yb 4 +),
(Sb 4 + , As 3 +),	(Br 5 + , Mo 5 +),	(Rb 5 + , Sr 4 +),
(Bi 4 + , As 3 +),	(Pm 3 + , Kr 1 +),	(Rb 5 + , Sb 5 +),
(As 3 + , Br 2 +),	(Sm 3 + , Kr 1 +),	(Rb 5 + , Bi 5 +),
(Kr 5 + , As 4 +),	(Dy 3 + , Kr 1 +),	(Rb 6 + , Rb 5 +),
(As 3 + , Zr 3 +),	(Pb 3 + , Kr 1 +),	(Rb 6 + , Sr 5 +),

(As^{3+} , Nd^{3+}),	(Kr^{3+} , Kr^{2+}),	(Mo^{6+} , Rb^{7+}),
(As^{3+} , Pm^{3+}),	(Rb^{3+} , Kr^{2+}),	(Rb^{7+} , Sb^{6+}),
(As^{3+} , Tb^{3+}),	(Kr^{4+} , Kr^{3+}),	(Pd^{2+} , Sr^{1+}),
(As^{3+} , Dy^{3+}),	(Kr^{2+} , Cd^{1+}),	(I^{2+} , Sr^{1+}),
(As^{3+} , Ho^{3+}),	(Kr^{2+} , Sb^{1+}),	(Hf^{3+} , Sr^{1+}),
(As^{3+} , Er^{3+}),	(Kr^{2+} , Te^{1+}),	(Nb^{3+} , Sr^{2+}),
(As^{4+} , Br^{3+}),	(Kr^{2+} , Os^{1+}),	(Pr^{3+} , Sr^{2+}),
(Sr^{5+} , As^{5+}),	(Kr^{2+} , Ir^{1+}),	(Sr^{4+} , Sr^{3+}),
(Se^{6+} , As^{6+}),	(Kr^{2+} , Pt^{1+}),	(Sr^{2+} , Mo^{2+}),
(As^{5+} , Rb^{7+}),	(Kr^{2+} , Au^{1+}),	(Sr^{2+} , Tc^{2+}),
(Kr^{2+} , Se^{1+}),	(Kr^{3+} , Kr^{2+}),	(Sr^{2+} , Sb^{2+}),
(Cd^{2+} , Se^{1+}),	(Kr^{3+} , Nb^{3+}),	(Te^{5+} , Sr^{3+}),
(Te^{3+} , Se^{1+}),	(Kr^{3+} , Sb^{3+}),	(Sr^{3+} , Tc^{3+}),
(Ce^{3+} , Se^{1+}),	(Kr^{3+} , Cs^{2+}),	(Sr^{3+} , Tl^{3+}),
(Sr^{4+} , Sr^{3+}),	(Eu^{3+} , Nb^{2+}),	(Ag^{2+} , Ru^{1+}),
(Sr^{4+} , Sb^{4+}),	(Dy^{3+} , Nb^{2+}),	(Sb^{3+} , Ru^{2+}),
(Sr^{4+} , Gd^{4+}),	(Ho^{3+} , Nb^{2+}),	(Gd^{3+} , Ru^{2+}),
(Sr^{4+} , Yb^{4+}),	(Er^{3+} , Nb^{2+}),	(Lu^{3+} , Ru^{2+}),
(Zr^{3+} , Y^{1+}),	(Tm^{3+} , Nb^{2+}),	(Sb^{4+} , Ru^{3+}),
(Ag^{2+} , Y^{1+}),	(Pb^{3+} , Nb^{2+}),	(Bi^{4+} , Ru^{3+}),
(Hg^{2+} , Y^{1+}),	(Nb^{3+} , I^{1+}),	(Ag^{2+} , Rh^{1+}),
(Sn^{3+} , Y^{2+}),	(Nb^{3+} , Ba^{2+}),	(Lu^{3+} , Rh^{2+}),
(Nd^{3+} , Y^{2+}),	(Nb^{3+} , La^{2+}),	(Bi^{3+} , Rh^{2+}),
(Tb^{3+} , Y^{2+}),	(Nb^{3+} , Ce^{2+}),	(Te^{4+} , Rh^{3+}),
(Y^{3+} , Zr^{4+}),	(Nb^{3+} , Pr^{2+}),	(Rh^{2+} , Cs^{1+}),
(Y^{3+} , Hf^{4+}),	(Nb^{3+} , Nd^{2+}),	(Ce^{3+} , Pd^{1+}),
(Y^{3+} , Hg^{3+}),	(Nb^{3+} , Pm^{2+}),	(Pd^{2+} , In^{1+}),
(Y^{4+} , La^{4+}),	(Nb^{3+} , Sm^{2+}),	(Pd^{2+} , Ba^{1+}),
(Y^{6+} , Bi^{6+}),	(Nb^{3+} , Eu^{2+}),	(Pd^{2+} , La^{1+}),
(Zr^{3+} , Zr^{1+}),	(Nb^{3+} , Hg^{1+}),	(Pd^{2+} , Ce^{1+}),
(Ag^{2+} , Zr^{1+}),	(Nb^{3+} , Rn^{1+}),	(Pd^{2+} , Pr^{1+}),
(Hg^{2+} , Zr^{1+}),	(Nb^{3+} , Ra^{2+}),	(Pd^{2+} , Nd^{1+}),
(Sn^{3+} , Zr^{2+}),	(Nb^{4+} , Nd^{3+}),	(Pd^{2+} , Pm^{1+}),
(Nd^{3+} , Zr^{2+}),	(Nb^{4+} , Pm^{3+}),	(Pd^{2+} , Sm^{1+}),
(Pm^{3+} , Zr^{2+}),	(Nb^{4+} , Sm^{3+}),	(Pd^{2+} , Eu^{1+}),
(Sm^{3+} , Zr^{2+}),	(Nb^{4+} , Dy^{3+}),	(Pd^{2+} , Tb^{1+}),
(Dy^{3+} , Zr^{2+}),	(Nb^{4+} , Ho^{3+}),	(Pd^{2+} , Dy^{1+}),
(Nb^{4+} , Zr^{3+}),	(Nb^{4+} , Er^{3+}),	(Pd^{2+} , Lu^{1+}),
(Zr^{3+} , Zr^{1+}),	(Nb^{4+} , Hf^{3+}),	(Pd^{2+} , Ra^{1+}),
(Zr^{3+} , Nb^{1+}),	(Mo^{7+} , Nb^{7+}),	(Pd^{2+} , Ac^{1+}),
(Zr^{3+} , Mo^{1+}),	(Ag^{2+} , Mo^{1+}),	(Pd^{2+} , Pa^{1+}),
(Zr^{3+} , Tc^{1+}),	(Hg^{2+} , Mo^{1+}),	(Ag^{2+} , Ag^{1+}),
(Zr^{3+} , Gd^{1+}),	(Sb^{3+} , Mo^{2+}),	(La^{3+} , Ag^{2+}),
(Zr^{3+} , Tb^{1+}),	(Gd^{3+} , Mo^{2+}),	(Ag^{2+} , Ag^{1+}),
(Zr^{3+} , Dy^{1+}),	(Yb^{3+} , Mo^{2+}),	(Ag^{2+} , Sn^{1+}),
(Zr^{3+} , Ho^{1+}),	(Mo^{3+} , Rh^{2+}),	(Ag^{2+} , Hf^{1+}),
(Zr^{3+} , Er^{1+}),	(Mo^{3+} , In^{2+}),	(Ag^{2+} , Pb^{1+}),
(Zr^{3+} , Tm^{1+}),	(Mo^{3+} , Te^{2+}),	(Ag^{2+} , Bi^{1+}),
(Zr^{3+} , Yb^{1+}),	(Mo^{3+} , I^{2+}),	(Ag^{2+} , Es^{1+}),
(Zr^{3+} , Hf^{1+}),	(Mo^{3+} , La^{3+}),	(Cd^{2+} , Cd^{1+}),

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(Zr^{3+}, Tl^{1+}),	(Mo^{3+}, Pt^{2+}),	(Te^{3+}, Cd^{1+}),
(Zr^{3+}, Bi^{1+}),	(Mo^{3+}, Hg^{2+}),	(Ce^{3+}, Cd^{1+}),
(Zr^{3+}, Th^{1+}),	(Mo^{4+}, Pd^{3+}),	(Sb^{3+}, Cd^{2+}),
(Zr^{3+}, Pa^{1+}),	(Mo^{4+}, I^{3+}),	(Gd^{3+}, Cd^{2+}),
(Zr^{3+}, U^{1+}),	(Mo^{4+}, Hf^{4+}),	(Lu^{3+}, Cd^{2+}),
(Zr^{3+}, Np^{1+}),	(Bi^{5+}, Mo^{5+}),	(Bi^{3+}, Cd^{2+}),
(Zr^{3+}, Pu^{1+}),	(Mo^{5+}, Sn^{4+}),	(Cd^{2+}, Cd^{1+}),
(Zr^{3+}, Am^{1+}),	(Mo^{5+}, Nd^{4+}),	(Cd^{2+}, Te^{1+}),
(Zr^{3+}, Cm^{1+}),	(Mo^{5+}, Tb^{4+}),	(Cd^{2+}, I^{1+}),
(Zr^{3+}, Bk^{1+}),	(Ag^{2+}, Tc^{1+}),	(Cd^{2+}, Ba^{2+}),
(Zr^{3+}, Cf^{1+}),	(Eu^{3+}, Tc^{2+}),	(Cd^{2+}, Ir^{1+}),
(Zr^{3+}, Es^{1+}),	(Ho^{3+}, Tc^{2+}),	(Cd^{2+}, Pt^{1+}),
(Zr^{4+}, In^{4+}),	(Er^{3+}, Tc^{2+}),	(Cd^{2+}, Au^{1+}),
(Ag^{2+}, Nb^{1+}),	(Tm^{3+}, Tc^{2+}),	(Cd^{2+}, Hg^{1+}),
(Hg^{2+}, Nb^{1+}),	(Yb^{3+}, Tc^{2+}),	(Cd^{2+}, Ra^{2+}),
(Sm^{3+}, Nb^{2+}),	(Pb^{3+}, Tc^{2+}),	(I^{2+}, In^{1+}),
(Hf^{3+}, In^{1+}),	(Tb^{3+}, Xe^{1+}),	(Hg^{2+}, Tb^{1+}),
(Hg^{2+}, In^{1+}),	(Xe^{2+}, Cs^{1+}),	(Tb^{3+}, Tb^{2+}),
(Sb^{4+}, In^{3+}),	(Pb^{2+}, Cs^{1+}),	(Tb^{3+}, Tb^{2+}),
(Bi^{4+}, In^{3+}),	(Hf^{3+}, Ba^{1+}),	(Tb^{3+}, Dy^{2+}),
(In^{3+}, Bi^{3+}),	(Hf^{3+}, La^{1+}),	(Tb^{3+}, Ho^{2+}),
(Eu^{3+}, Sn^{2+}),	(Pr^{3+}, La^{2+}),	(Tb^{3+}, Er^{2+}),
(Ho^{3+}, Sn^{2+}),	(La^{3+}, Pr^{3+}),	(Tb^{3+}, Tm^{2+}),
(Er^{3+}, Sn^{2+}),	(La^{3+}, Nd^{3+}),	(Tb^{3+}, Yb^{2+}),
(Tm^{3+}, Sn^{2+}),	(La^{3+}, Pm^{3+}),	(Hf^{3+}, Dy^{1+}),
(Pb^{3+}, Sn^{2+}),	(La^{3+}, Tb^{3+}),	(Hg^{2+}, Dy^{1+}),
(Te^{4+}, Sn^{3+}),	(La^{3+}, Dy^{3+}),	(Dy^{3+}, Lu^{2+}),
(Pb^{4+}, Sn^{4+}),	(La^{3+}, Ho^{3+}),	(Pb^{4+}, Dy^{4+}),
(Sn^{4+}, Sb^{4+}),	(La^{3+}, Er^{3+}),	(Hf^{3+}, Ho^{1+}),
(Sn^{4+}, Gd^{4+}),	(Hf^{3+}, Ce^{1+}),	(Hg^{2+}, Ho^{1+}),
(Sn^{4+}, Lu^{4+}),	(Pr^{3+}, Ce^{2+}),	(Ho^{3+}, Hf^{2+}),
(Ce^{3+}, Sb^{1+}),	(Ce^{3+}, Os^{1+}),	(Ho^{3+}, Pb^{2+}),
(Sb^{3+}, Sb^{2+}),	(Ce^{3+}, Ir^{1+}),	(Hf^{3+}, Er^{1+}),
(Gd^{3+}, Sb^{2+}),	(Ce^{3+}, Pt^{1+}),	(Hg^{2+}, Er^{1+}),
(Yb^{3+}, Sb^{2+}),	(Ce^{3+}, Au^{1+}),	(Er^{3+}, Hf^{2+}),
(Sb^{3+}, Sb^{2+}),	(Ce^{3+}, Po^{1+}),	(Er^{3+}, Pb^{2+}),
(Sb^{3+}, Bi^{2+}),	(Hf^{3+}, Pr^{1+}),	(Hf^{3+}, Tm^{1+}),
(Sb^{4+}, Te^{3+}),	(Pr^{3+}, Pr^{2+}),	(Hg^{2+}, Tm^{1+}),
(Te^{3+}, Te^{1+}),	(Pr^{3+}, Pr^{2+}),	(Tm^{3+}, Hf^{2+}),
(Ce^{3+}, Te^{1+}),	(Pr^{3+}, Nd^{2+}),	(Tm^{3+}, Pb^{2+}),
(Bi^{4+}, Te^{3+}),	(Pr^{3+}, Pm^{2+}),	(Hf^{3+}, Yb^{1+}),
(Te^{3+}, Te^{1+}),	(Pr^{3+}, Sm^{2+}),	(Hg^{2+}, Yb^{1+}),
(Te^{3+}, Ba^{2+}),	(Pr^{3+}, Eu^{2+}),	(Yb^{3+}, Bi^{2+}),
(Te^{3+}, Ir^{1+}),	(Pr^{3+}, Tb^{2+}),	(Hf^{3+}, Lu^{1+}),
(Te^{3+}, Pt^{1+}),	(Pr^{3+}, Dy^{2+}),	(Pb^{3+}, Lu^{2+}),
(Te^{3+}, Au^{1+}),	(Pr^{3+}, Ho^{2+}),	(Lu^{3+}, Bi^{2+}),
(Te^{3+}, Ra^{2+}),	(Pr^{3+}, Er^{2+}),	(Hg^{2+}, Hf^{1+}),
(Te^{5+}, Eu^{4+}),	(Pr^{3+}, Rn^{1+}),	(Pb^{3+}, Hf^{2+}),
(Te^{5+}, Ho^{4+}),	(Hf^{3+}, Nd^{1+}),	(Hf^{3+}, Tl^{1+}),
(Te^{5+}, Er^{4+}),	(Nd^{3+}, Gd^{2+}),	(Hf^{3+}, Ra^{1+}),

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(Te 5 + , Tm 4 +),	(Nd 3 + , Er 2 +),	(Hf 3 + , Ac 1 +),
(Te 5 + , Pb 4 +),	(Nd 3 + , Tm 2 +),	(Hf 3 + , Th 1 +),
(I 2 + , Ba 1 +),	(Nd 3 + , Yb 2 +),	(Hf 3 + , Pa 1 +),
(I 2 + , La 1 +),	(Pb 4 + , Nd 4 +),	(Hf 3 + , U 1 +),
(I 2 + , Ce 1 +),	(Hf 3 + , Pm 1 +),	(Hf 3 + , Np 1 +),
(I 2 + , Pr 1 +),	(Pm 3 + , Lu 2 +),	(Hf 3 + , Pu 1 +),
(I 2 + , Nd 1 +),	(Pb 4 + , Pm 4 +),	(Hf 3 + , Am 1 +),
(I 2 + , Pm 1 +),	(Hf 3 + , Sm 1 +),	(Hf 3 + , Cm 1 +),
(I 2 + , Sm 1 +),	(Sm 3 + , Lu 2 +),	(Hf 3 + , Bk 1 +),
(I 2 + , Eu 1 +),	(Pb 4 + , Sm 4 +),	(Hf 3 + , Cf 1 +),
(I 2 + , Tb 1 +),	(Hf 3 + , Eu 1 +),	(Hg 2 + , Tl 1 +),
(I 2 + , Dy 1 +),	(Eu 3 + , Hf 2 +),	(Hg 2 + , Th 1 +),
(I 2 + , Lu 1 +),	(Eu 3 + , Pb 2 +),	(Hg 2 + , Pa 1 +),
(I 2 + , Ra 1 +),	(Hf 3 + , Gd 1 +),	(Hg 2 + , U 1 +),
(I 2 + , Ac 1 +),	(Hg 2 + , Gd 1 +),	(Hg 2 + , Np 1 +),
(I 2 + , Pa 1 +),	(Tb 3 + , Gd 2 +),	(Hg 2 + , Pu 1 +),
(I 2 + , Am 1 +),	(Gd 3 + , Bi 2 +),	(Hg 2 + , Am 1 +),
(Nd 3 + , Xe 1 +),	(Hf 3 + , Tb 1 +),	(Hg 2 + , Cm 1 +),
(Hg 2 + , Bk 1 +),	(Hg 2 + , Cf 1 +),	(Hg 2 + , Es 1 +),
(Pb 3 + , Pb 2 +),	(Pb 3 + , Pb 2 +),	(K 1 + , Cl),
(As 2 + , H),	(K 1 + , F),	(Cr 2 + , Cl),
(Ru 2 + , H),	(Cr 2 + , F),	(Fe 2 + , Cl),
(In 2 + , H),	(Fe 2 , F),	(As 2 + , K),
(Te 2 + , H),	(As 2 + , Na),	(Ru 2 + , K),
(Al 2 + , H),	(Ru 2 + , Na),	(In 2 + , K),
(Ar 1 + , H),	(In 2 + , Na),	(Te 2 + , K),
(As 2 + , Li),	(Te 2 + , Na),	(Al 2 + , K),
(Ru 2 + , Li),	(Al 2 + , Na),	(Ar 1 + , K),
(In 2 + , Li),	(Ar 1 + , Na),	(As 2 + , Fe),
(Te 2 + , Li),	(Ti 2 + , Na),	(Ru 2 + , Fe),
(Al 2 + , Li),	(As 2 + , Al),	(In 2 + , Fe),
(Ar 1 + , Li),	(Ru 2 + , Al),	(Te 2 + , Fe),
(Ti 2 + , Li),	(In 2 + , Al),	(Al 2 + , Fe),
(As 2 + , B),	(Te 2 + , Al),	(Ar 1 + , Fe),
(Rb 1 + , B),	(Al 2 + , Al),	(Ti 2 + , Fe),
(Mo 2 + , B),	(Ar 1 + , Al),	(As 2 + , Co),
(Ru 2 + , B),	(Ti 2 + , Al),	(Ru 2 + , Co),
(In 2 + , B),	(As 2 + , Si),	(In 2 + , Co),
(Te 2 + , B),	(Tc 2 + , Si),	(Te 2 + , Co),
(Al 2 + , B),	(Ru 2 + , Si),	(Al 2 + , Co),
(Ar 1 + , B),	(Tl 2 + , Si),	(V 2 + , Co),
(Ti 2 + , B),	(N 1 + , Si),	(Tc 2 + , Cu),
(As 2 + , C),	(Al 2 + , Si),	(Tl 2 + , Cu),
(Tc 2 + , C),	(V 2 + , Si),	(N 1 + , Cu),
(Ru 2 + , C),	(As 2 + , P),	(P 2 + , Cu),
(In 2 + , C),	(Ru 2 + , P),	(V 2 + , Cu),
(Te 2 + , C),	(In 2 + , P),	(Ga 2 + , Br),
(N 1 + , C),	(Te 2 + , P),	(Se 2 + , Br),
(Al 2 + , C),	(Al 2 + , P),	(Rh 2 + , Br),
(V 2 + , C),	(Ar 1 + , P),	(Sn 2 + , Br),

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(As 2 + , O),	(Tc 2 + , S),	(P 2 + , Br),
(Tc 2 + , O),	(Sn 2 + , S),	(K 1 + , Br),
(Ru 2 + , O),	(Tl 2 + , S),	(Cr 2 + , Br),
(Tl 2 + , O),	(N 1 + , S),	(Fe 2 + , Br),
(N 1 + , O),	(P 2 + , S),	(As 2 + , Rb),
(Al 2 + , O),	(V 2 + , S),	(Rb 1 + , Rb),
(V 2 + , O),	(Ga 2 + , Cl),	(Mo 2 + , Rb),
(Ga 2 + , F),	(Se 2 + , Cl),	(Ru 2 + , Rb),
(Se 2 + , F),	(Rh 2 + , Cl),	(In 2 + , Rb),
(Rh 2 + , F),	(Sn 2 + , Cl),	(Te 2 + , Rb),
(Sn 2 + , F),	(Xe 2 + , Cl),	(Al 2 + , Rb),
(Pb 2 + , F),	(Pb 2 + , Cl),	(Ru 2 + , Pb),
(Ar 1 + , Rb),	(P 2 + , Tl),	(In 2 + , Pb),
(Ti 2 + , Rb),	(V 2 + , Tl),	(Te 2 + , Pb),
(Ga 2 + , I),	(Tc 2 + , Au),	(Al 2 + , Pb),
(Se 2 + , I),	(Sn 2 + , Au),	(V 2 + , Pb),
(Rh 2 + , I),	(Tl 2 + , Au),	(Tc 2 + , Po),
(Sn 2 + , I),	(N 1 + , Au),	(Tl 2 + , Po),
(P 2 + , I),	(P 2 + , Au),	(N 1 + , Po),
(Cr 2 + , I),	(V 2 + , Au),	(P 2 + , Po),
(Fe 2 + , I),	(As 2 + , Hg),	(V 2 + , Po),
(As 2 + , Cs),	(Tc 2 + , Hg),	(Ga 2 + , At),
(Rb 1 + , Cs),	(Ru 2 + , Hg),	(Se 2 + , At),
(Mo 2 + , Cs),	(Tl 2 + , Hg),	(Rh 2 + , At),
(Ru 2 + , Cs),	(N 1 + , Hg),	(Sn 2 + , At),
(In 2 + , Cs),	(Al 2 + , Hg),	(Tl 2 + , At),
(Te 2 + , Cs),	(V 2 + , Hg),	(N 1 + , At),
(Al 2 + , Cs),	(As 2 + , As),	(P 2 + , At),
(Ar 1 + , Cs),	(Ru 2 + , As),	(Cr 2 + , At),
(Ti 2 + , Cs),	(In 2 + , As),	(Fe 2 + , At),
(Tc 2 + , Se),	(Te 2 + , As),	(As 2 + , Ge),
(Tl 2 + , Se),	(Al 2 + , As),	(Tc 2 + , Ge),
(N 1 + , Se),	(Ar 1 + , As),	(Ru 2 + , Ge),
(P 2 + , Se),	(Ti 2 + , As),	(In 2 + , Ge),
(V 2 + , Se),	(As 2 + , Ce),	(N 1 + , Ge),
(Tc 2 + , Te),	(Tc 2 + , Ce),	(Al 2 + , Ge),
(Sn 2 + , Te),	(Ru 2 + , Ce),	(V 2 + , Ge),
(Tl 2 + , Te),	(In 2 + , Ce),	(As 2 + , Ga),
(N 1 + , Te),	(N 1 + , Ce),	(Rb 1 + , Ga),
(P 2 + , Te),	(Al 2 + , Ce),	(Ru 2 + , Ga),
(V 2 + , Te),	(V 2 + , Ce),	(In 2 + , Ga),
(Fe 2 + , Te),	(As 2 + , Fr),	(Te 2 + , Ga),
(As 2 + , As),	(Rb 1 + , Fr),	(Al 2 + , Ga),
(Ru 2 + , As),	(Ru 2 + , Fr),	(Ar 1 + , Ga),
(In 2 + , As),	(In 2 + , Fr),	(Ti 2 + , Ga),
(Te 2 + , As),	(Te 2 + , Fr),	(As 2 + , In),
(Al 2 + , As),	(Al 2 + , Fr),	(Rb 1 + , In),
(Ar 1 + , As),	(Ar 1 + , Fr),	(Mo 2 + , In),
(Ti 2 + , As),	(Ti 2 + , Fr),	(Ru 2 + , In),
(Tc 2 + , Sb),	(As 2 + , Ge),	(In 2 + , In),

(Tl 2 + , Sb), (Tc 2 + , Ge), (Te 2 + , In),
(N 1 + , Sb), (Ru 2 + , Ge), (Al 2 + , In),
(P 2 + , Sb), (In 2 + , Ge), (Ar 1 + , In),
(V 2 + , Sb), (N 1 + , Ge), (Ti 2 + , In),
(As 2 + , Bi), (Al 2 + , Ge), (As 2 + , Ag),
(Ru 2 + , Bi), (V 2 + , Ge), (Tc 2 + , Ag),
(In 2 + , Bi), (As 2 + , Sn), (Ru 2 + , Ag),
(Te 2 + , Bi), (Tc 2 + , Sn), (N 1 + , Ag),
(Al 2 + , Bi), (Ru 2 + , Sn), (Al 2 + , Ag),
(Ar 1 + , Bi), (N 1 + , Sn), (V 2 + , Ag),
(Tc 2 + , Tl), (Al 2 + , Sn), (P 2 + , OH),
(Sn 2 + , Tl), (V 2 + , Sn), (V 2 + , OH),
(Tl 2 + , Tl), (As 2 + , Pb), (Tc 2 + , SH),
(N 1 + , Tl), (Tc 2 + , Pb), (Sn 2 + , SH),
(Ga 2 + , BF3), (Rh 2 + , UF6), (Tl 2 + , SH),
(Se 2 + , BF3), (Sn 2 + , UF6), (N 1 + , SH),
(Tc 2 + , BF3), (Tl 2 + , UF6), (P 2 + , SH),
(Rh 2 + , BF3), (P 2 + , UF6), (V 2 + , SH),
(Sn 2 + , BF3), (Cr 2 + , UF6), (Fe 2 + , SH),
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(Tl 2 + , BF3), (Fe 2 + , UF6), (Ga 2 + , CN),
(N 1 + , BF3), (Tc 2 + , CF3), (Se 2 + , CN),
(P 2 + , BF3), (Tl 2 + , CF3), (Rh 2 + , CN),
(Cr 2 + , BF3), (N 1 + , CF3), (Sn 2 + , CN),
(Fe 2 + , BF3), (P 2 + , CF3), (P 2 + , CN),
(Se 2 + , NO2), (V 2 + , CF3), (K 1 + , CN),
(Rh 2 + , NO2), (As 2 + , CCl3), (Cr 2 + , CN),
(Xe 2 + , NO2), (Tc 2 + , CCl3), (Fe 2 + , CN),
(Pb 2 + , NO2), (Ru 2 + , CCl3), (Tc 2 + , SCN),
(K 1 + , NO2), (In 2 + , CCl3), (Sn 2 + , SCN),
(Cr 2 + , NO2), (N 1 + , CCl3), (Tl 2 + , SCN),
(As 2 + , O2), (Al 2 + , CCl3), (N 1 + , SCN),
(Rb 1 + , O2), (V 2 + , CCl3), (P 2 + , SCN),
(Ru 2 + , O2), (Ga 2 + , SiF3), (V 2 + , SCN),
(In 2 + , O2), (Se 2 + , SiF3), (Fe 2 + , SCN),
(Te 2 + , O2), (Rh 2 + , SiF3), (Ga 2 + , SeCN),
(Al 2 + , O2), (Sn 2 + , SiF3), (Se 2 + , SeCN),
(Ar 1 + , O2), (P 2 + , SiF3), (Tc 2 + , SeCN),
(Ti 2 + , O2), (K 1 + , SiF3), (Rh 2 + , SeCN),
(As 2 + , SF6), (Cr 2 + , SiF3), (Sn 2 + , SeCN),
(Tc 2 + , SF6), (Fe 2 + , SiF3), (Tl 2 + , SeCN),
(Ru 2 + , SF6), (As 2 + , NH2), (N 1 + , SeCN),
(Tl 2 + , SF6), (Tc 2 + , NH2), (P 2 + , SeCN),
(N 1 + , SF6), (Ru 2 + , NH2), (Cr 2 + , SeCN),
(Al 2 + , SF6), (In 2 + , NH2), (Fe 2 + , SeCN),
(V 2 + , SF6), (Te 2 + , NH2), (Tl 2 + , PH 2),
(Ga 2 + , WF6), (N 1 + , NH2), (N 1 + , PH 2),
(Se 2 + , WF6), (Al 2 + , NH2), (Al 2 + , PH 2),
(Tc 2 + , WF6), (V 2 + , NH2), (V 2 + , PH 2),
(Rh 2 + , WF6), (Tc 2 + , PH 2), (Tc 2 + , OH),
(Sn 2 + , WF6), (Ru 2 + , PH 2), (Tl 2 + , OH),

(Tl^{2+} , WF_6), (Fe^{2+} , WF_6), (N^{1+} , OH),
(N^{1+} , WF_6), (Ga^{2+} , UF_6), (Cr^{2+} , WF_6),and
(Se^{2+} , UF_6), (P^{2+} , WF_6).

212. ~~In a~~ A rocket comprising a walled vessel defining an interior volume containing a rocket fuel and means to direct thrust generated by said rocket fuel, wherein the improvement ~~comprising:~~ comprises

a rocket fuel comprising a source of at least one hydrino hydride ion and a source of protons, and a means to initiate a reaction between said hydrino hydride ion and protons.

213. A rocket according to claim 212, wherein said rocket fuel further comprises at least one burn modulator.

214. A rocket according to claim 212, wherein said means for initiating said reaction between said hydrino hydride ion and said protons comprises a conventional rocket fuel.

215. A rocket according to claim 212, wherein said rocket fuel is liquid at ambient temperature and pressure.

216. A rocket according to claim 212, wherein said rocket fuel is gaseous at ambient temperature and pressure.

217. A rocket according to claim 212, wherein said rocket fuel is solid at ambient temperature and pressure.

218. A rocket according to claim 212, wherein said source of said protons comprises an acid.

219. A rocket according to claim 218, wherein said acid is a super-acid.

220. A rocket according to claim 218, wherein said acid is selected from the group consisting of HF, HCl, H_2SO_4, HNO_3, the reaction products of HF and SbF_5, the reaction products of HCl and Al_2Cl_6, the reaction products of H_2SO_3F and SbF_5, the reaction products of H_2SO_4 and SO_2, and combinations thereof.

221. A rocket according to claim 212, wherein said source of protons comprises H^1.

222. A rocket according to claim 212, wherein said source of protons comprises H^2.

223. A rocket according to claim 212, wherein said source of protons comprises H^3.

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224. A rocket according to claim 212, wherein said source of hydride ion comprises at least one compound comprising a hydrino hydride ion and at least one other element.

225. A rocket according to claim 224, wherein said compound comprises at least one hydrino atom having a binding energy of about $13.6/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

226. A rocket according to claim 224, wherein said compound comprises at least one dihydrino molecule having a first binding energy of about $15.5/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

227. A rocket according to claim 224, wherein said compound comprises at least one dihydrino molecular ion having a first binding energy of about $16.4/n^2$ eV, wherein

n is a fraction whose numerator is 1 and denominator is an integer greater than 1, and at least one other element.

228. A rocket according to claim 224, wherein said compound comprises a hydrino hydride ion having a binding energy of about 0.65 eV and at least one other element.

229. A rocket according to claim 224, wherein the compound further comprises one or more selected from the group consisting of ordinary hydrogen molecules, ordinary hydride ions, ordinary hydrogen atoms, protons, ordinary hydrogen molecular ions, and ordinary H^{3+}ions.

230. A rocket according to claim 224, wherein the compound has a formula selected from the group of formulae consisting of MH, MH_2, and M_2H_2 wherein M is an alkali cation and H is selected from the group consisting of increased binding energy hydride ions, hydrino atoms and dihydrino molecules.

231. A rocket according to claim 224, wherein the compound has the formula MH_n wherein n is 1 or 2, M is an alkaline earth cation and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

232. A rocket according to claim 224, wherein the compound has the formula MHX wherein M is an alkali cation, X is one of a neutral atom, a molecule, or a singly negatively charged anion, and H is elected from the group consisting of hydrino hydride ions and hydrino atoms.

233. A rocket according to claim 232, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

234. A rocket according to claim 224, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

235. A rocket according to claim 234, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

236. A rocket according to claim 224, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a doubly negatively charged anion, and H is a hydrino atom.

237. A rocket according to claim 236, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

238. A rocket according to claim 224, wherein the compound has the formula M_2HX wherein M is an alkali cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

239. A rocket according to claim 238, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

240. A rocket according to claim 224, wherein the compound has the formula MH_n wherein n is an integer from 1 to 5, M is an alkali cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

241. A rocket according to claim 224, wherein the compound has the formula M_2H_n

wherein n is an integer from 1 to 4, M is an alkaline earth cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

242. A rocket according to claim 224, wherein the compound has the formula M_2XH_n wherein n is an integer from 1 to 3, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

243. A rocket according to claim 242, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

244. A rocket according to claim 224, wherein the compound has the formula $M_2X_2H_n$ wherein n is 1 or 2, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

245. A rocket according to claim 244, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

246. A rocket according to claim 224, wherein the compound has the formula M_2X_3H wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

247. A rocket according to claim 246, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

248. A rocket according to claim 224, wherein the compound has the formula M_2XH_n wherein n is 1 or 2, M is an alkaline earth cation, X is a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

249. A rocket according to claim 248, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

250. A rocket according to claim 224, wherein the compound has the formula $M_2XX'H$ wherein M is an alkaline earth cation, X is a singly negatively charged anion, X' is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

251. A rocket according to claim 250, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

252. A rocket according to claim 250, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

253. A rocket according to claim 224, wherein the compound has the formula $MM'H_n$ wherein n is and integer from 1 to 3, M is an alkaline earth cation, M' is an alkali metal cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

254. A rocket according to claim 224, wherein the compound is $MM'XH_n$ wherein n is 1 to 2, M is an alkaline earth cation, M' is an alkali metal cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

255. A rocket according to claim 254, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

256. A rocket according to claim 224, wherein the compound is MM'XH where M is an alkaline earth cation, M' is an alkali metal cation, X is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

257. A rocket according to claim 256, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

258. A rocket according to claim 224, wherein the compound has the formula MM'XX'H where M is an alkaline earth cation, M' is an alkali metal cation, X and X' are each a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

259. A rocket according to claim 258, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

260. A rocket according to claim 224, wherein the compound has the formula H_nS wherein n is 1 or 2, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species.

261. A rocket according to claim 224, wherein the compound has the formula $MSiH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen

species.

262. A rocket according to claim 224, wherein the compound has the formula $MXM'H_n$ wherein n is an integer from 1 to 5;

M is an alkali or alkaline earth cation;

X is a singly negatively charged anion or a doubly negatively charged anion;

M' is selected from the group consisting of Si, Al, Ni, the transition elements, the inner transition elements, and the rare earth elements; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

263. A rocket according to claim 262, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

264. A rocket according to claim 262, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

265. A rocket according to claim 224, wherein the compound has the formula $MAlH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

266. A rocket according to claim 224, wherein the compound has the formula MH_n wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of the transition elements, the inner transition elements, and the rare earth element cations and nickel; and

the hydrogen content H_n comprises at least one increased binding energy

hydrogen species.

267. A rocket according to claim 224, wherein the compound has the formula $MNiH_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

268. A rocket according to claim 224, wherein the compound has the formula $MM'H_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum;

M' is selected from the group consisting of the transition elements, the inner transition elements, and rare earth element cations; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

269. A rocket according to claim 224, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

270. A rocket according to claim 224, wherein the compound has the formula Si_2H_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

271. A rocket according to claim 224, wherein the compound has the formula SiH_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

272. A rocket according to claim 224, wherein the compound has the formula TiH_n wherein n is an integer from 1 to 4, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

273. A rocket according to claim 224, wherein the compound has the formula Al_2H_n wherein n is an integer from 1 to 4 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

274. A rocket according to claim 224, wherein the compound has the formula $MXAlX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

275. A rocket according to claim 274, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

276. A rocket according to claim 274, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

277. A rocket according to claim 224, wherein the compound has the formula $MXSiX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen

species.

278. A rocket according to claim 277, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

279. A rocket according to claim 277, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

280. A rocket according to claim 224, wherein the compound has the formula SiO_2H_n wherein n is an integer from 1 to 6 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

281. A rocket according to claim 224, wherein the compound has the formula $MSiO_2H_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

282. A rocket according to claim 224, wherein the compound has the formula MSi_2H_n wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

283. A rocket according to claim 224, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

284. A rocket according to claim 224, wherein the compound is greater that 50 atomic

percent pure.

285. A rocket according to claim 224, wherein the compound is greater that 90 atomic percent pure.

286. A rocket according to claim 224, wherein said at least one other element comprises at least one selected from the group consisting of a proton, ordinary hydrogen atom, ordinary hydride ions, ordinary hydrogen molecules, ordinary hydrogen molecular ions and ordinary H_3^+ ion.

287. A rocket according to claim 224, wherein said at least one other element comprises at least one element selected from the group consisting of alkaline earth metals and alkali metals.

288. A rocket according to claim 287, wherein said element comprises lithium or lithium ion.

289. A rocket according to claim 224, wherein said at least one other element comprises at least one element selected from the group consisting of organic compounds.

290. A rocket according to claim 224, wherein said at least one other element comprises at least one element selected from the group consisting of semiconductors .

291. A rocket according to claim 224, wherein said compound comprising:

(a) at least one neutral, positive or negative increased binding energy hydrogen species having a binding energy:

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for

which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies at ambient conditions, or is negative; and

(b) at least one other element, wherein said increased binding energy hydrogen species is selected from the group consisting of H_n, H_n^-, and H_n^+, where n is an integer of 1 to 8, and n is greater than 1 when H has a positive charge.

292. A rocket according to claim 291, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

a\

$$\text{Binding Energy} = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (b) hydrogen atom having a binding energy greater than about 13.6 eV; (c) hydrogen molecule having a first binding energy greater than about 15.5 eV; and (d) molecular hydrogen ion having a binding energy greater than about 16.4 eV.

293. A rocket according to claim 291, wherein the increased binding energy hydrogen species comprises a hydride ion having a binding energy of about 3.0, 6.6, 11.2, 16.7, 22.8 29.3, 36.1, 42.8, 49.4, 55.5, 61.0, 65.6, 69.2, 71.53, 72.4, 71.54, 68.8, 64.0, 56.8, 47.1, 34.6, or 19.2.

294. A rocket according to claim 291, wherein said increased binding energy hydrogen species is a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge.

295. A rocket according to claim 291, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydrino atom having a binding energy of about 13.6 eV/(1/p)^2, where p is an integer greater than 1; (b) a hydride ion having a binding energy represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron

mass, a_0 is the Bohr radius, and *e* is the elementary charge; (c) a trihydrino molecular ion, H_3^+ (1/p), having a binding energy of about $22.6/(1/p)^2$ eV; (d) a dihydrino molecule having a binding energy of about $15.5/(1/p)^2$ eV; and (e) a dihydrino molecular ion with a binding energy of about $16.4/(1/p)^2$ eV.

296. A rocket according to claim 295, wherein p is 2 to 200.

297. A rocket according to claim 295, wherein p is 2 to 24.

298. A rocket according to claim 295, wherein said increased binding energy hydrogen species is negative.

299. A rocket according to claim 212, wherein said source of hydrino hydride ion comprises a source of 2 or more types of hydrino hydride ions.--